Algebra I
Lesson Plans
for Block Schedule

Algebra I Pacing Guide

(Based on Block Lessons from the Prentice Hall Textbook)

Days	Unit Name	Objective(s) (SCOS 2003)	Textbook Reference
1-5	**Numeration** • Working with "real" numbers	**1.02** Use formulas and algebraic expressions, including *iterative* and *recursive* forms, to model and solve problems. **3.01** Use matrices to display and interpret data. **3.02** Operate with matrices to solve problems. **1.01a** Write equivalent forms of algebraic expressions to solve problems. Apply the laws of exponents.	**Lessons 1-1 to 1-8.**
6-10	**Solving Equations** • Simple • Multi-step • Variables on both sides • Literal equations • Statistics	**1.02** Use formulas and algebraic expressions, including *iterative* and *recursive* forms, to model and solve problems. **4.01a** Solve problems using tables, graphs, and algebraic properties.	**Lessons 2-1 to 2-7.**

11-18	**Relations and Functions** • How to display • Functional notation • Domain and range • Direct Variation • Patterns • Function Rule	**4.01** Use linear functions or inequalities to model and solve problems; **a)** justify results. Solve using tables, graphs, and algebraic properties. **3.03** Create linear models for sets of data to solve problems. **1.03** Model and solve problems using direct variation. **1.02** Use formulas and algebraic expressions, including *iterative* and *recursive* forms, to model and solve problems.	**Lessons 5-2 to 5-6; 5-1**
19-31	**Linear Equations and Their Graphs** • Slope • Point-Slope Form • Standard Form • Slope-Intercept Form • Parallel and perpendicular lines • Trend lines/line of best fit • Absolute	**4.01a** Use linear functions or inequalities to model and solve problems; justify results. Solve using tables, graphs, and algebraic properties. **4.01** Use linear functions or inequalities to model and solve problems; **b)** Interpret constants and coefficients in the context of the problem. **2.02** Use the parallelism or perpendicularity of lines and segments to solve problems. **3.03** Create linear models for sets of data to	**Lessons 6-1 to 6-7.**

33 **33a-** **33d** **34-39**	value **Inequalities** • Linear inequalities •Solving and graphing inequalities • Compound inequalities •Absolute Value equations and inequalities **Systems of Equations and Inequalities** • Graphing • Substitution • Elimination • Application	solve problems. **4.01a** Use linear functions or inequalities to model and solve problems; justify results. Solve using tables, graphs, and algebraic properties. **4.03** Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.	**Lessons** **7-5** **3-1** **3-2** **3-3** **3-4** **3-5** **3-6** **7-1** **7-2** **7-3** **7-4** **7-6**
40-49	**Exponents and Exponential Functions** • Zero and negative exponents • Multiplication properties of exponents • Division properties of	**1.01a** Write equivalent forms of algebraic expressions to solve problems. Apply the laws of exponents. **1.02** Use formulas and algebraic expressions, including *iterative* and *recursive* forms, to model and solve problems.	**Lessons 8-1 to 8-8.**

	exponents • Exponential functions • Growth and decay	**4.04** Graph and evaluate exponential functions to solve problems. **2.02** Use the parallelism or perpendicularity of lines and segments to solve problems.	
50-61	**Polynomials and Factoring** • Monomials • Binomials • Trinomials • Add and subtract polynomials • Multiply polynomials • Special cases • Factoring-GCF • Difference of squares • Perfect Squares	**1.01b** Write equivalent forms of algebraic expressions to solve problems; operate with polynomials. **1.01c** Write equivalent forms of algebraic expressions to solve problems; factor polynomials. **1.02** Use formulas and algebraic expressions to solve problems.	**Lessons 9-1 to 9-8.**
62-63	**Simplifying Rational Expressions**	**1.01b** Write equivalent forms of algebraic expressions to solve problems; operate with polynomials.	**Lessons 12-3 only.**
63-68	**Radical Expressions** • Simplifying radicals • Pythagorean Theorem	**1.01a** Write equivalent forms of algebraic expressions to solve problems. Apply the laws of exponents. **2.01** Find the lengths and midpoints of segments to	**Lessons 11-1, 11-2, 11-3, 11-4**

	• Operations with radical expressions • Distance and midpoint formulas	solve problems. **3.03** Create linear models for sets of data to solve problems.	
69-80	**Quadratic Equations and Functions** • Quadratic graphs • Quadratic Functions • Solving quadratic equations • Factoring to solve quadratic equations • Quadratic formula • Best Model	**4.02** Graph, factor, and evaluate quadratic functions to solve problems. **1.02** Use formulas to model and solve problems. **4.04** Graph and evaluate exponential functions to solve problems.	**Lessons 10-1, 10-2, 10-4, 10-5, 10-7, 10-9**

Algebra I Lesson Plans for Block Schedule

Day 1  **Yippee! It's Algebra Time**

<u>Essential Question:</u> What do "YOU" expect to get from Algebra I this semester? What do "I" expect from you during the next 90 days?

<u>Objective(s):</u> 1.02 Use formulas and algebraic expressions, including iterative and recursive forms, to model and solve problems.

1.01 Write equivalent forms of algebraic expressions to solve problems.

<u>"SAP":</u> Have students choose an index card that has a capital letter printed on the back. Take roll. Have students stand and say their name, and then state an adjective that begins with their chosen letter, that best describes something about them…their interests, hobbies, etc. Discuss pacing guide, accumulation of grades, and class expectations/rules. Share math cartoon.

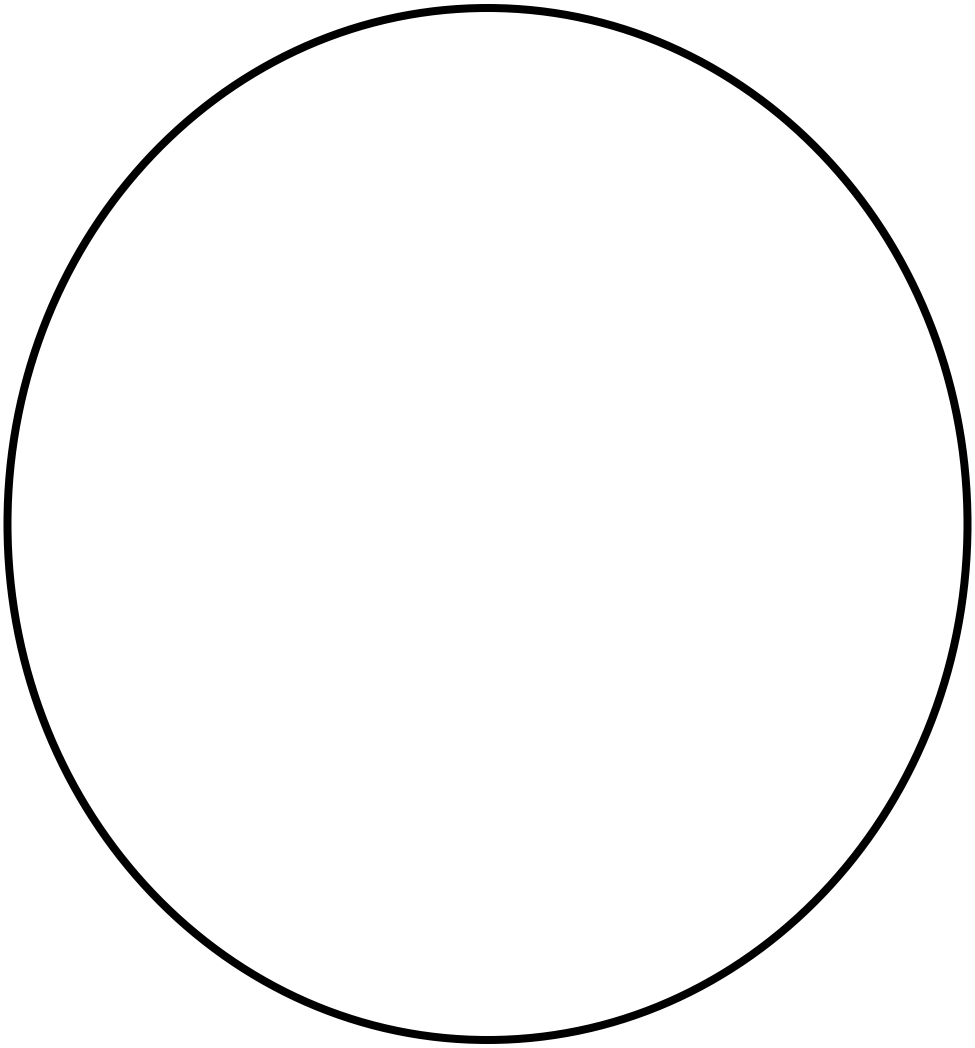
<u>Lesson Anatomy</u>: Pass out assigned calculators for the semester. Teacher led review from "diagnosing readiness" – Chapter 1, lesson 1, to get general assessment. Use the word "variable" in a weather context and extract a meaning. Show how the term can easily apply to algebra. Hold up sentence strips and practice how to translate verbal expressions into algebraic expressions. Highlight examples from the textbook, and provide clues and/or hints to aid students in the process.

Review what "powers" are; base, exponent. Write some examples and have students explain their meanings. Define what the words *evaluate* and *simplify* mean. Work through several examples to illustrate their meaning (similarities and differences). Review "order of operations" and the substitution property.

<u>Summarizing Activity:</u> Pass out "gold medallions" (see attached – run on gold paper). Have students solve sample problems practicing the lesson's material. Cut out the medallions when completed. Hole-punch and hang from a colored ribbon. Correct and hang on the "Hall of Fame" board.

<u>Homework:</u> Hand-made "practice" crossword puzzle.

<u>Hall of Fame Medallion</u>



Algebra I Lesson Plans for Block Schedule

Day 2 – *Warm-Up – Matching Signs & Symbols* (Math Start – pg. 52**)**

Essential Question: **What are "real" numbers; what do they include? How can I**

explain what “absolute value” means in algebra?

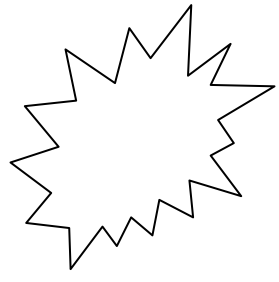
<u>Objective(s):</u> 1.02 Use formulas and algebraic expressions to model and solve problems.

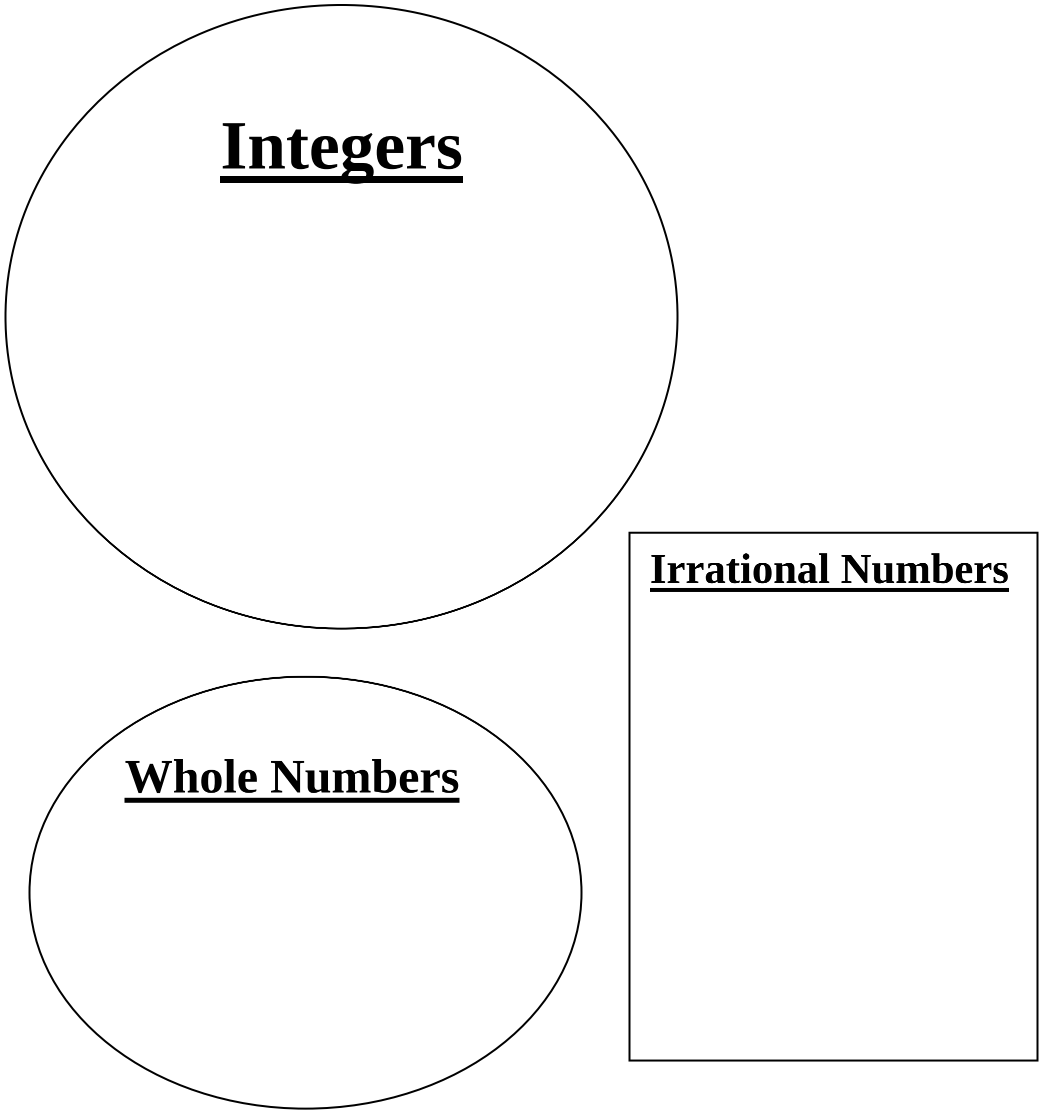
<u>“SAP”:</u> Have students construct a “foldable”’ (Dinah Zike - “Teaching Mathematics with Foldables) with construction paper, folded in half, and colored copy paper with shapes on it. As the vocabulary words (natural numbers, whole numbers, integers, rational numbers, and irrational number) are discussed, have students write examples in the appropriate colored shapes (see attached). The completed <u>left</u> hand side of the foldable should look like the diagram on pg. 18 of TE. On the right side, number line representations of absolute value will be modeled with pictures, statements, and example problems.

<u>Lesson Anatomy</u>: Go over homework puzzle. Collect to file in student portfolios. Do skills check on the overhead. Have a discussion about what real numbers are; that every REAL number corresponds to a point on the number line. Clarify by example. Work through first part of the foldable. Model how the ‘absolute value’ of a number is simply the distance it is away from “0”! Show the symbol and how absolute value problems are operationally solved. Complete <u>foldable</u> activity (see attached).

<u>Summarizing Activity:</u> Have students number off 1,2,3 …1,2,3…to get into 3 groups. Pass out “Think-Pair-Share” activity designed as a “tic-tac-toe” board guided practice. Allow students to rotate and choose point on the board to solve and share with the group. Take turns until all 9 blocks are solved and discussed.

<u>Homework:</u> Tic-tac-toe “winner” worksheet where answers to questions are in the boxes. They need to solve the problems below and color code their solutions to the puzzle with their colored pencils.




Integers
Whole Numbers
Irrational Numbers

Rational Numbers

What number types can be used to describe?

a) your shoe size ________________________

b) the number of siblings you have _____________

c) the temperature on a hot/cold day ____________

d) the number of quarts of paint you need to buy to paint your room _______________

e) the number of quarts of paint you use when you paint your room ______________

True OR False?

All integers are rational numbers? ____
All negative numbers are integers? ____
Every multiple of 3 is odd? ____

Simplify each expression.

$4 + \lvert 3 - 1 \rvert =$ _____	$\lvert 41 - 38 \rvert + 6 =$ _____
$\lvert 24 \rvert + \lvert -4 \rvert =$ _____	$\lvert 12 \rvert \cdot \lvert -4 \rvert =$ _____
$\lvert a - a \rvert + a =$ _____	$\lvert -6 + 4 \rvert + \lvert 3 \rvert =$ ____

Think-Pair-Share

"Tic-Tac-Toe"

Name: ________________________ **Date: ________________**

Solve each problem. Write your answers in the box of the question. Shade each box with your chosen colored pencil. The one who has the most shaded "tic-tac-toe's" **is the winner. Hint – the problems with variables mean: if c = 5, d = 1, and e = 6.**

$\lvert 12-21 \rvert =$	$2e + \left\lvert \frac{c}{d} \right\rvert =$	$\lvert d + 2 \rvert + \lvert -7 \rvert =$
$- \lvert c + d \rvert =$	$\left\lvert \frac{e - d}{c} \right\rvert =$	$- \lvert 3/4 \rvert$
$\lvert 1/3 + 3/4 \rvert =$	$\lvert 12 \rvert - \lvert -21 \rvert =$	$3 \cdot \lvert -23 + (-9) \rvert =$

Color Key:

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Day 3 *Warm-Up - Solving Tricky Math Problems (Math Smart pg. 50)*

Essential Question: **How do I (+, -, x, ÷) REAL numbers? What is a "matrix" as it applies to real numbers?**

Objective(s): 3.01 Use matrices to display and interpret data.
3.02 Operate with matrices to solve problems.

"SAP": Pass out two colored pencils to each student and one sheet of white paper. Create a Four Tab foldable. Under each of the 4 operations, model examples with colored circles to solve a variety of basic integer operations. Examples include:

3 + 4; 3 + (-4); -3 + 4; -3 + (-4); 3 – (-4); -3 – 4; -3(4); -3(-4); 6 ÷ 3; 6 ÷ (-3)

Lead into operations with fractions. Work through several examples using the calculator. Put 10 questions on the over-head. Give students 3-5 minutes to complete. Award 1st and 2nd place completers after answers are checked. After a discussion on matrices students will get into groups of three. Using prepared folders that each contains matrix brackets; whole, decimal, and fractional numbers; as well as operational signs, students will take turns solving matrix problems that each member will take turn creating. Each group is responsible for completing nine problems.

Lesson Anatomy: Review by checking "tic-tac-toe" homework puzzle. The students will then be engaged in integer/real number activity. Illustrate to students what happens to integer problems when a variable(s) are added to the problems. Model:

14x = 48x = _____; asking students if these addends can be combined. What about -100mn + 27mn = _____; 38p – (-25p) + 16pq = ____ What is the "catch" in this problem? Continue to show additional examples until the concept is understood – you can only manipulate the numbers if they share the *same* variable, keeping in mind the variables represent a real number. Describe to students what a matrix is and show, by example (TE pg. 27) how one is arranged. Model examples from pg. 27, 35, and 45 on how to solve, first by pencil and paper, then using the calculator.

Summarizing Activity: Pass out to each student a 12 Question assessment based on the past three days content. Students are to solve each problem and fill in the correct answers. Turn in by the end of class.

Homework: Practice 1-6 (evens only)

12-Question Assessment
Your Goal –"*Purr-fection*"

<u>100/100</u>

Name: ________________________ **Date: ________________**

Solve the following problems.

1. 8.3 – 5.1 ________________

2. -64 – (-31) ________________

3. $5t^3 - 3t^3$ ________________

4. $\begin{bmatrix} -3 & -2 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix} =$ ________________

5. $\begin{bmatrix} \frac{1}{2} \\ -1 \end{bmatrix} - \begin{bmatrix} \frac{2}{3} \\ -3 \end{bmatrix} =$ ________________

6. $\left|-3 \quad - \quad -3(-4)\right| \quad =$ ________________

7. $\left(\frac{5}{8}\right)\left(\frac{-3}{4}\right) =$ _______________

8. $\left(\frac{11}{16}\right) + \left(\frac{4}{9}\right) =$ ______________

9. $\left(\frac{3}{4}\right) + \left(\frac{-11}{9}\right) + \left(\frac{3}{32}\right) =$ ______________

10. $\left(\frac{-3}{8}\right) - \left(\frac{7}{12}\right) + \left(\frac{-2}{35}\right) =$ ______________

11. $\left(\frac{6}{7}\right)\left(\frac{5}{6}\right)\left(\frac{-7}{15}\right) =$ ______________

12. $\begin{bmatrix} 1 & -4 \\ 5 & -6 \end{bmatrix} - \begin{bmatrix} 4 & -3 \\ 7 & -1 \end{bmatrix} =$ ______________

Day 4 *Warm-Up – Math Smart – pg. 45 (Simplifying Expressions Using Exponents)*

Essential Question: **How do I use the "distributive" property to simplify algebraic expressions?**

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems
a) Apply the laws of exponents.

"SAP": Pass out to each student a sheet of colored paper that has a (__,__), +, -, or whole numbers 0-9 (some with variables). Make sure each student has one. Call on (__,__), +, and – students to come and stand at the front of the class. Call on additional students to come to the front of the room to create the following:

5(8 + 4) ; 9(7 + 3) ; 11(6 - 1); 2(5x + 3); 6(m + 5); $\frac{1}{3}$**(3x – 2); -(6x + 4); -(7 – 5x)**

As each problem is modeled and simplified, describe the vocabulary terms: *terms, constant, coefficient, and like terms.* **Students will then complete a "distributive" problem search where they will find 10 problems in a "search puzzle", highlighting each problem and answer in the puzzle with a similar colored marker.**

Lesson Anatomy: Check warm-up and homework. Review for students by examples on the over-head, the *commutative, associative, identity (+,x), and zero* **properties. Examples can include:**

2 + 3 = 3 + 2
6x · 2y = 2y · 6x
(4 + 3) + 2 = 4 + (3 + 2)
(ab · cd) · 5 = ab · (cd · 5)

Ask what the following is an example of: (3y + 2y) + 7 = 7 + (2y + 3y) Explain that when both commutative and associative properties exist in a problem, the "order" rule reigns! Continue by showing examples of the "identity" properties of addition and multiplication, followed by the "zero" property. Equate the coefficient to a paper-boy throwing the newspaper to each house on the block. Complete above activity with students. Return to seats. Together, have the students solve the following in their notebooks.

a) 7k + k = b) 2x + 8x = c) 4ab – ab = d) 25pq – 4 = e) 5(r + 2) + 7r =
f) 6x + 7(y + x) = g) 3(2x – 6) = h) 5x(12 – 6) i) 3m + 2n + 4p + 3n – m =
j) 2(7x + y) + 4(3x + 2y)

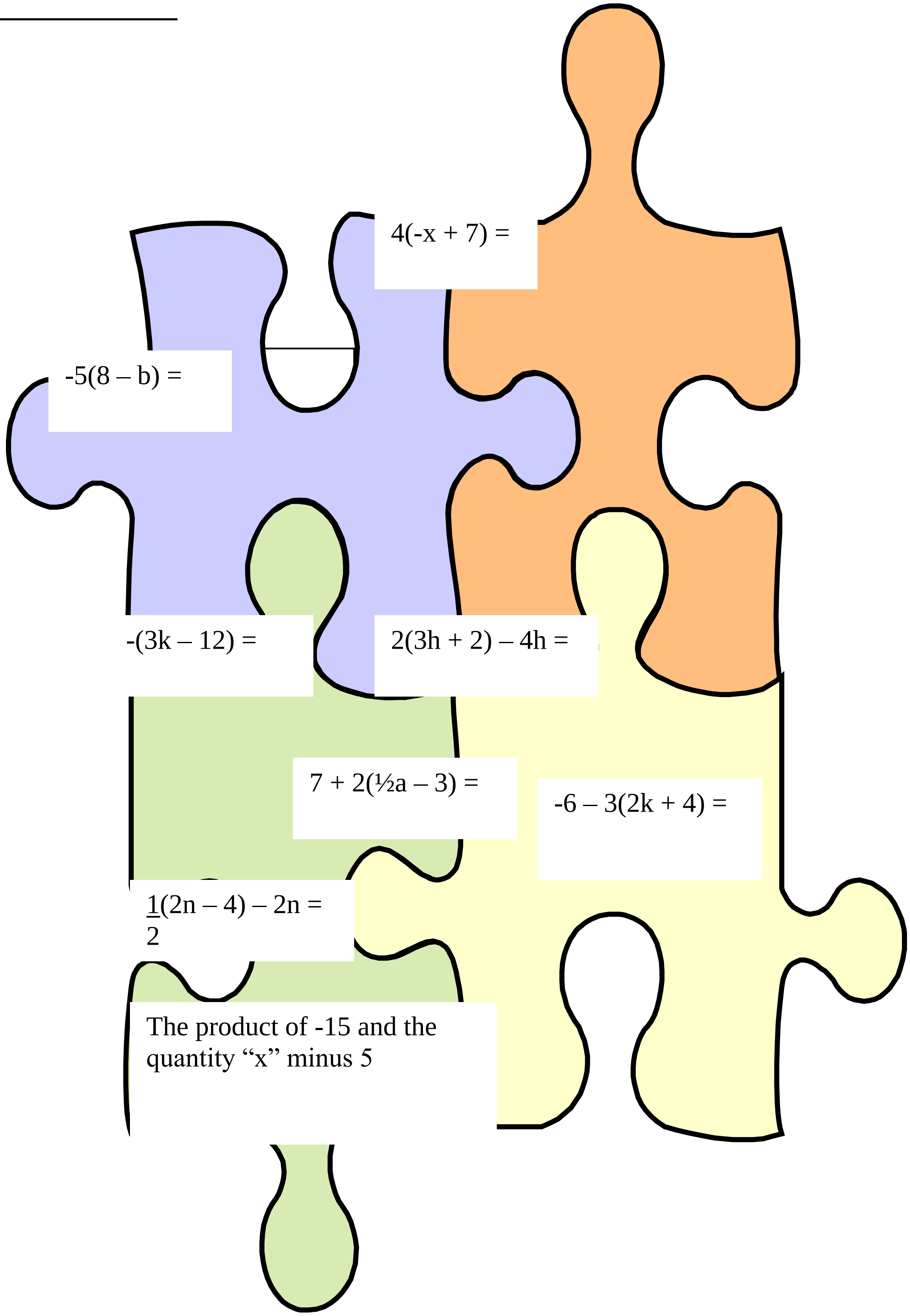
Summarizing Activity: Have students get into pairs. Together, have them translate and solve:

- **3 times the quantity** m **minus 7**
- **-4 times the quantity 4 plus** w
- **twice the quantity** b **plus 9**
- **the product of -11 and the quantity** n **minus 8**
- **2 times the quantity 3 times** c **plus 9**

Homework: Distributive Puzzle (see attached)

Distributive Puzzle

Name: ____________________



<u>Algebra I Lesson Plans for Block Schedule</u>

Day 5 – *Warm-up #7-1 Birthday Puzzle – Knowing your Math Facts!*

Essential Question: How can I review to be successful on my first test?

Objective(s): All from day 1 through day 5.

"SAP": Pair students to do matching activity. Assign a favorite "sports team name" to each pair. Put the following on a large sheet of chart paper.

_____Commutative (+)	**a) (15xy)·20=15x(y·20)**
_____Associative (+)	**b) p· 1=p**
_____Zero Property	**c) 112+0=112**
_____Commutative (x)	**d) 22·10=10·22**
_____Associative (x)	**e) 53+n=n+53**
_____Identity	**f) 10(13x+27)**
_____Distributive	**g) (12+18)+30=12+(18+30)**

When you say "go", students will have 45 seconds to place the letters in the correct order. Assign bonus points to top 3 teams.

Lesson Anatomy: Warm-up and homework check. Complete above activity. Divide students into 3 teams. On 3 pieces of chart paper, in random order, place the following words: ***term, evaluate, algebraic expression, rational, absolute value, matrix, integer, power, coefficient, simplify, irrational numbers, real numbers, inverse.*** **Play the "Flyswatter Game" to review vocabulary. Assign bonus points to top 3 teams.**

Human Multiple Choice Review. (See attached)

Summarizing Activity: Students individually complete practice test (timed). Check in class if time permits, to clarify any problems. (Chapter 1- Cumulative Review)

Homework: Textbook – pg. 70, #1-26, 31, 32.

Human Multiple Choice Review
Chapter 1

Solve by using your "Order of Operation Rules".

1.	**$3(3+7) \div 5=$**	**a) 4 b) 5 c) 6 d) 8**
2.	**$10(4+3\cdot 2) \div (2\cdot 6-7)=$**	**a) 15 b) 20 c) 10 d) 12**
3.	**$27\div 3(5-3)=$**	**a) 14 b) 16 c) 12 d) 18**
4.	**$5[(9+3) - 3^2] + 5=$**	**a) 3 b) 7 c) 5 d) 9**

(Make the following questions into multiple choice answers, so students can choose to stand under choice a), b), c), or d).

What is the correct algebraic expression for the following verbal expressions?

Ten less than four times a number and y.

Half the sum of a number squared and nine.

The product of a number and seven decreased by two squared.

Sixteen more than half a number.

Express using "exponents".

$6\cdot 6\cdot m\cdot m\cdot m\cdot y\cdot y$

What is 4^3 =

Evaluate: If a = 2, b = 4, and c= (-3)

$ba-ac =$ **$7(a + b) - c =$**

$\frac{9(b + a)}{c-1} =$ **$\frac{8(a+b)}{4c} =$**

Name the property shown by each statement. (comm.., assoc., ID(+), ID(x), zero,dist.,)

1(mnp) = mnp

(2x + 3y) + 5x = 5x + (3y + 2x) ________________

5ab + 0 = 5ab _______________

7 (10c – 4) = _____________

5 (wx + 3) = 5 (3 + wx) __________________

12cd·(4cd · cd) = (12cd · 4cd) · cd __________________

Simplify each expression.

5a + 7a + 10b + 5b = __________________

3(x + 2y) – 2y = ________________

4(c + d) + 2(c + 9) + 4c = ___________________

6(3g + 2) + 2(g + 3) = ______________________

4(xy + 2) – 2 = ______________________

Bonus!!!

What is $\frac{2}{10}$ as a decimal? _______ **What is it as a %? _______**

What do I need to multiply it by if I want it to = 1! _____________

Algebra I Lesson Plans for Block Schedule

Day 6 *Warm-Up – Algebra with Pizzaz – pg. 5 (Distributive Property)*

<u>Essential Question:</u> How do I solve 2-step equations/multi-step equations and relate the process to real life problem situations.

<u>Objective(s):</u> 1.02 – Use formulas and algebraic expressions to model and solve problems.

<u>"SAP":</u> Students will create a foldable to illustrate the different types of equations; how to solve them and relate them to problem-solving situations.

<u>Lesson Anatomy</u>: Explain that equations are like a balance scale where the quantity on one side has to balance the quantity on the other side. Tell students that equations have a variable and that the purpose of solving the equation is to find out what numerical value the "variable" represents, so when you substitute it in the equation, the two sides of the equal sign will be the same. Demonstrate how to do foldable to create 5 tabs. On tab one, show the process of solving: a) $x+12=28$; b) $y-13=-45$; c) $x+(-15) = 32$; and d) $y-(-36)=-41$. On tab 2, demonstrate a) $3x-2=4$; b) $7=2y-3$; d) $6a+2 = -8$ e) $0.75c+3=14$ Ask what it is about these last examples that makes them a little different to the first set. On tab 3, model examples a) $10=\frac{m}{4}+2$

b) $1=\frac{k}{12}+5$; c) $-3 + \frac{m}{3} = 12$; d) $\frac{-y}{2} + 14=-1$ Be sure to remind students that they can NOT solve for a negative variable, so need to ÷ by -1 to make variable positive.

On tab 4, solve a) $\frac{x + 2}{9} = 5$; b) $\frac{a – 10}{-4} = 2$; c) $\frac{b – 7}{-2} = -6$ Ask how these differ from the examples on tab 3?

On tab 5, show students how to solve TE pg. 85 #67, 69, 74.

<u>Summarizing Activity:</u> Have students pair up to complete pg. 84 #2-34, 40, 57.

<u>Homework:</u> Crossword Puzzle

<u>Equation Solving Puzzle</u>

Name: __________________ Date: __________________

1	☺	2		☺	3
	☺		☺	4	
☺	5	☺	6		☺
7		☺		☺	8
☺	☺	9	☺	10	
11			☺		☺

Across

1. $3x - 9 = -12$
2. $-5x - 2 = -107$
3. $7x + 2x + 10 - 1 = 2x + 16$
4. $\frac{-x}{2} - 3 = 5$
5. $x + x + x - 1 = -13$
6. $\frac{x - 8}{4} = -10$
7. $42 - 2x = 82$

9. $x + 3 = -2x + 6$

Down

1. $2x + 8 = -16$
2. $\frac{x}{3} + 1 = 9$
3. $\frac{x}{4} - 1 = 3$
4. $3x + 9 = -27$
5. $17 + 2x = -63$
6. $-2x - 3x - 1 - 5 = 144$

8. $-6x - 15 = -81$
9. $\frac{x - 6}{-3} = -4$

10. $-9x - 12 = 177$

10. $\frac{x + 48}{8} = 3$

11. $\frac{x}{12} - 4 = 20$

Algebra I Lesson Plans for Block Schedule

Day 7 – *Warm-Up – Algebra with Pizzaz – pg. 6 (Combining Like Terms)*

Essential Question: How do I solve equations when I have to use the distributive property and/or there is a variable on BOTH sides of the equal sign?

Objective(s): 1.02 – Use formulas and algebraic expressions, to model and solve problems.

"SAP": Students will work through guided instruction sheet, filling in the blanks and answering all questions. Students will complete a "mystery" square, involving equations and their solutions (see attached – No More "Dog-Gone" Equations).

Lesson Anatomy: Warm-up and homework check. Review steps to problem solving by working through any problems from homework puzzle. Pass out stapled guided instruction packet. Have students follow along soliciting answers to questions that will help them through the process of solving multi-step equations and equations with variables on both sides. Work through packet together, until the last page – YOUR TURN.

Summarizing Activity: Complete YOUR TURN page from packet with a partner. Ticket to Leave – Write one question about today's lesson – something that may have you puzzled.

Homework: p. 703, Extra Practice Ex. 1-22

More" Dog-Gone" Equation Solving!

Date: ____________________ **Name: _____________________**

Not to worry ladies and gentlemen…you are already "equation –solving" experts!! DON'T sweat the small stuff – you're good and you know it! By the time you complete this packet, you will be MASTER COMPLETERS in solving all types of equations, so let's cruise on through this short journey. All aboard!

<u>Simplify</u> each expression.

2n – 3n = _____ **-4+3b+2+5b = _____** **9(w-5) = ______**

-10(b-12) = _____ **3(-x+4) = ______** **5(6-w) = ______**

<u>Great – you got them all right, didn't you?!</u>

<u>Evaluate</u> each expression.

28 – a + 4a = ______ (for a=5) **8 + x –7x = ______ (for x=-3)**

(8n+1)3 = _____ (for n=-2) **-(17+3y) = _____ (for y=6)**

<u>GOOD FOR YOU!</u>

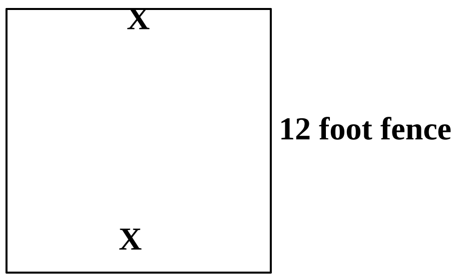
Do you remember when you can "mess" with the numbers in an equation? If they share ____________________________. Let's combine like terms and solve the following equations. Follow me…

2c + c + 12 = 78 **4b + 16 + 2b = 46**

What about…-2(b – 4) = 12 What do you need to do first? __________________ Solve it!

What about…3(k + 8) = 21 ….solve it.

Gertrude the gardener is planning a rectangular garden area in a community garden. Her garden will be next to an existing 12 foot fence.
The gardener has a total of 44 feet of fencing to build the other three sides of her garden. How long will the garden be if the width is 12 feet?



Let "x" = length of a side adjacent to the fence.

Equation: ___ + ___ + ____ = ____ Solve

What if the equation contains the *dreaded* *fraction?*

Example #1: $\frac{2x}{3} + \frac{x}{2} = 7$

Step One:__________________________________

Step Two: _________________________________

Step Three: _______________________________

Example #2: $\frac{2x}{3} - \frac{5x}{8} = 26$

Answer: ______

Write an equation to model each situation. Solve.

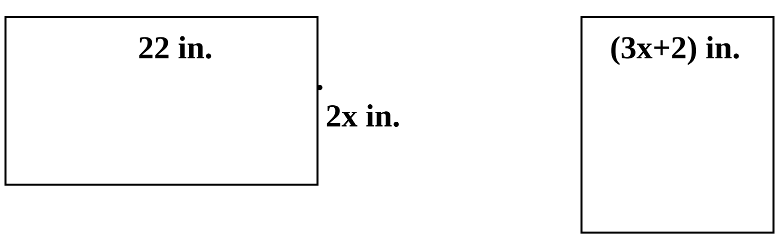
Two friends are renting an apartment. They pay the landlord the first month's rent. The landlord also requires them to pay an additional half of a month's rent for a security deposit. (What's a security deposit???) The total amount they pay the landlord before moving in is $1,725. What is the monthly rent?

Let "x" = ______________________________

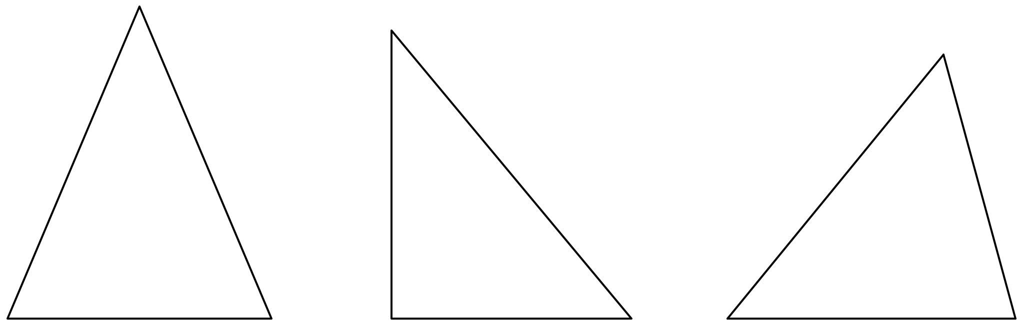
Equation:______________________________ Solve.

Answer: ______

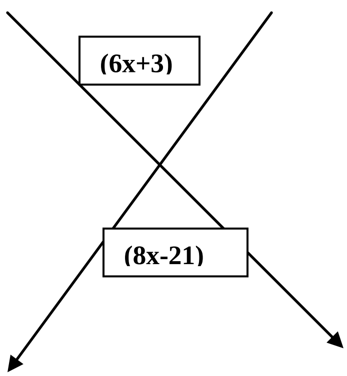
The perimeter of each rectangle is 64 inches. Find the value of "x".



Find the value of "x" in each of the triangles. (Insert data in triangles from TE pg. 92 before running copies.)



Look at this picture☺



If where the lines intersect could be substituted with an = sign, the equation would read ____________________________. Golly!! There is a variable on both sides!! Help!

6x + 3 = 8x – 21 **Step One: ________________________________**

Step Two: __________________________

Step Three: ________________________

Answer: _____________

Solve the next *<u>two</u>* equations.

$-36 + 2w = -8w + w$

$4p – 10 = p + 3p – 2p$

Oh…No…Look what is happening here!

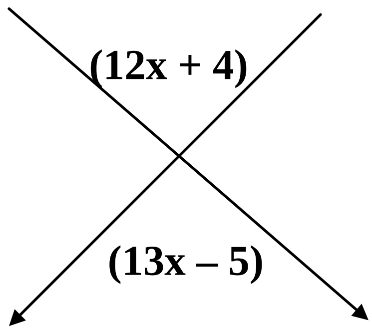
$10 – -8a = 2(5 – 4a)$

$6m – 5 = 7m + 7 – m$

<u>YOUR TURN!!!</u>

Solve.

1.



2. $18x - 5 = 3(6x - 2)$

3. $5m - 2(m + 2) = -(2m + 15)$

4. $\frac{3}{5}k - \frac{1}{10}k = \frac{1}{2}k + 1$

5. $6(6g - 2) + 8(1 - 5g) = 2g$

6. $\begin{bmatrix} 2x+1 & a-1 \\ w-4 & 9y \end{bmatrix} = \begin{bmatrix} -5x-6 & 5a \\ 3w+4 & -3y \end{bmatrix}$

Find the value of each variable by solving the appropriate equations.

Algebra I Lesson Plans for Block Schedule

Day 8 *Warm-Up – Puzzle – "Evaluating Expressions" Math Smart 5-3*

<u>Essential Question:</u> How do I define a variable in terms of another variable, transform literal equations, and apply a variety of formulas to word problem situations?

<u>Objective(s):</u> 1.02 Use formulas and algebraic expressions, including recursive and iterative forms, to model and solve problems.

<u>"SAP":</u> Get with a partner and brainstorm what a "formula" is…where are many formula used in science, at home, and in business. What are synonyms/applications for the word? Allow 1-2 minutes. Share. Students will be engaged in "formula chart" diagrams.

<u>Lesson Anatomy</u>: Check homework from previous day. Solve warm-up puzzle. Discuss with class what a <u>formula</u> is and how they apply everyday. Explain to students that they will be looking at several formulas, some familiar- others not, and rearranging the terms to solve for different variables in the formula. Since they are expert equation solvers, and understand the processes involved, they will be very successful with the day's tasks. Ask students, "who remembers what the formula is for finding the area of a circle?" Write on overhead. Together, work through solving for the letter "r" in the formula. Pass out "Formulas" graphic organizer. Work through chart examples together, then allow students to do "You Try" on their own. Check answers and clear up any confusion. From typed word problems from TE pgs. 104-106, make a transparency and place on overhead. In notebooks, have students place 'given' information from problem(s) into a table. Work to write correct equations from the table(s). Solve equations to arrive at correct answers.

<u>Summarizing Activity:</u> Whose Line Is It? Students group in triads. When "go" is called, one student writes the first line of the problem, then rotates to person two, who writes the next step on the line, and finally the third person gets the problem, does any needed last step and records the final answer. First team to finish with the correct answers, wins a prize.

<u>Homework:</u> Textbook pg. 108 #11, 14, 26

<u>WORD PROBLEMS</u>

A train leaves the Greensboro station at 1 p.m. It travels at an average rate of 60 mi/hr. A high –speed train leaves the same station an hour later. It travels at an average rate of 96 mi/hr. The second train follows the same route as the first train

on a track parallel to the first. In how many hours will the second train catch up with the first?

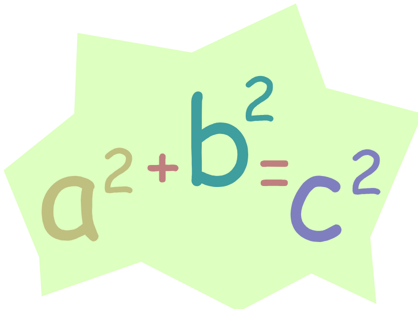
Equation:

John and his sister leave their home traveling in opposite directions on a straight road. John drives 15 mi/hr faster than his sister. After 3 hours, they are 225 miles apart. Find John's rate and his sister's rate.

Equation:

Jamel drives into the city to buy a CD at the music store. Because of traffic conditions, he averages only 15 mi/hr. On his drive home he averages 35 mi/hr. If the total travel time is 2 hours, how long does it take him to drive to the music store?

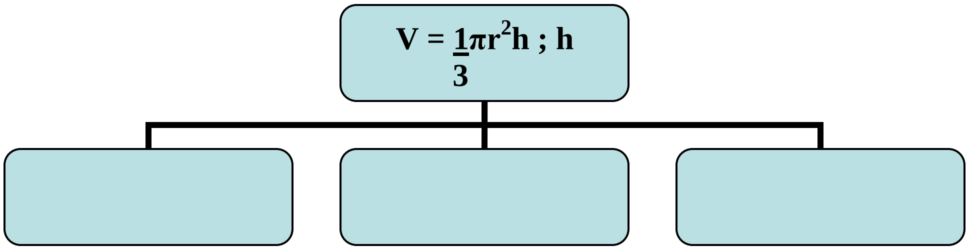
Equation:

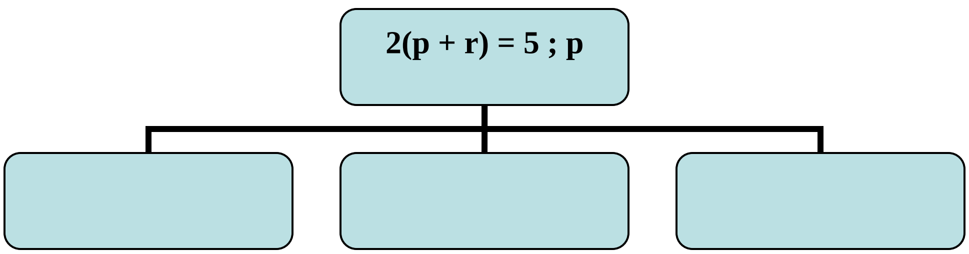


"Formulas"!

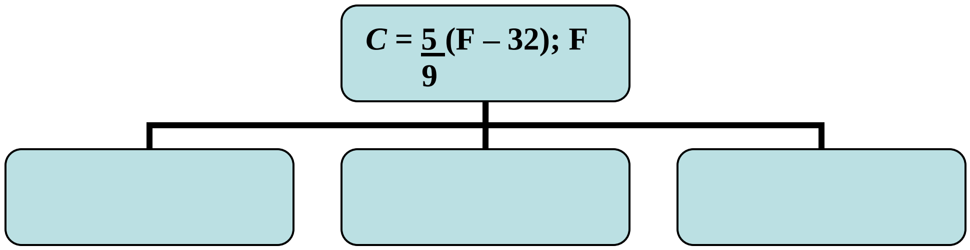
ab – d = c; b

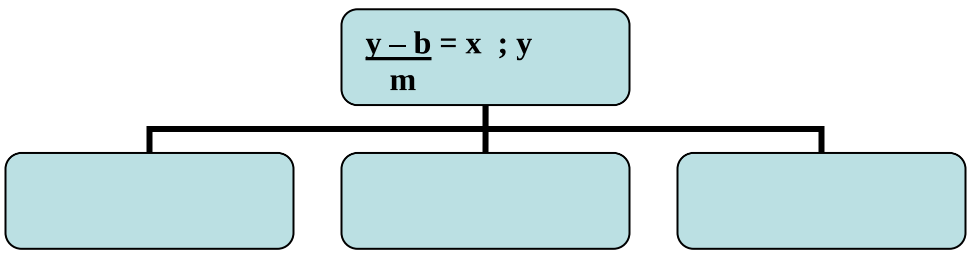
$A = \frac{1}{2}bh$; h





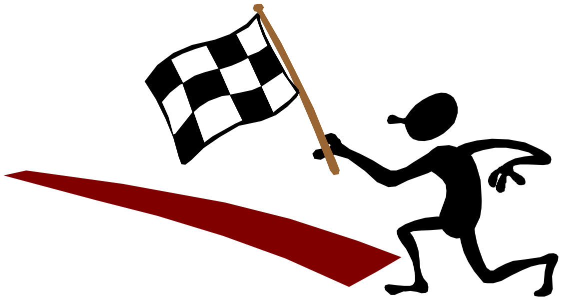
You Try!!! $\mathbf{A = P + Prt}$ *for "t"*





You Try!!

$$\frac{m}{n} = \frac{p}{q}$$ *for "q"*



Whose Line Is It?

Team: __________

$5x + y = 3$ (y)

____

____

____

$V = \frac{ah}{3}$ (a)

____

____

____

$F = \frac{9}{5}C + 32$ (c)

____

____

____

$xy - z = a$ (z)

____

____

____

$30 - ab = c$ (b)

____

____

____

$a - \frac{ab}{y} = \frac{c}{y}$ (y)

____

____

____

$\frac{m-1}{a} = F$ (m)

____

____

____

$\frac{a+c}{b} + y = 1$ (c)

____

____

____

$\frac{x-5}{c} = d$ (x)

____

____

____

And the winner is……… **Team: ______**

Algebra I Lesson Plans for Block Schedule

Day 9 – *Warm-Up – "Eating Out" – Put # 1-8 on overhead. As students enter the room, have them work out the problem.*

Essential Question: How do I make "statistical" sense out of a set of raw data?

Objective(s): 4.01 (a) Solve problems using tables, graphs, and algebraic properties.

"SAP": Have the students name 8 cars they would love to drive someday. (Suggest cars their families drive.) List them on the board. Discuss the important criteria people consider when shopping for new cars. Solicit student responses. Explain that as consumers, one of things important in the decision –making, is *gas mileage.* For those who are on a budget, this factor figures in heavily to many car purchase decisions, especially when you have to consider not only the price of the car, but the fluctuating prices of gas. Beside each of the 8 cars, list the "city" and "highway" miles per gallon. Pass out a sheet of colored paper and have students put their name, the date, and their favorite car choice from the list, at the top of the page. Then, have them list the 8 vehicles in the middle top-half of the sheet. On the right side, have them write the city mileage data of 17, 18, 20, 21, 24, 26, 36, and 38 (miles per gallon). On the left side of each car name, have them record the highway mileage of 22, 24, 30, 30, 32, 33, 38, and 43 (miles per gallon).

Lesson Anatomy: Check homework. Share daily objective. Ask students to recall studying the concept of "measures of central tendency". Retrieve vocabulary responses of mean, mode, and median. Define each and have students record on their papers. Ask students, "who is familiar with "stem-and-leaf" plots?" Together, Place the above data in a plot. Find the mode, median, and mean. (Tell students, if they have trouble moving on the plot, they can order the data, from least to greatest, horizontally on paper. From this point, lead the discussion to another term the students can recall – the RANGE. Explain, that the range is a piece of data that falls under "measures of variation" – how spread out is the data? Find the range. Introduce the terms "upper quartile" and "lower quartile". Show students how to find each. Then, calculate the Interquartile Range (IQR). Proceed to show students how to construct "box-and-whisker" plots (pictorial representation) of the date, and how to find if the data has any "outliers". Share what it signifies – that it can skew the "mean" of the data enough that it is not a reliable measure of central tendency. Put on overhead, example 5 (TE pg. 121) – have students find central tendency calculations and measures of variation to reinforce concepts. Ask the questions – when should one use the "mean" to describe data? The median? Clarify this important concept by providing an example – company pay raises – why is the median used? To link data to algebra, choose a student in the class and explain example 2 (TE pg. 119). All the above will be recorded on the front and back of their colored sheets of paper.

<u>Summarizing Activity:</u> Each student will work with a partner to interview and complete questions 32-36, pg. 123.

<u>Homework:</u> Chapter review pg. 125-126 # 10-50 evens only.

<u>Eating Out!</u>

1. **Pick the number of times a week that you would like to have dinner out. (Less than 10 but more than once)**

2. **Multiply this number by 2.**

3. **Add 5.**

4. **Multiply it by 50.**

5. **If you have already had your birthday this year, add 1753. If you haven't, add 1752.**

6. **Now, subtract the four digit year you were born. (You should have a 3-digit number)**

7. **The first digit of this was your original number of how many times you wanted to eat out each week.**

8. **The next two numbers are your age!!!YES!!!**

<u>Smarty Pants</u>

How many three-cent stamps are there in a dozen?   (12)

There are ten blue socks and ten red socks in your drawer. The lights are out and you must find a matching pair. What is the fewest number of socks you could take out of the drawer to be certain you have a pair? (3)

If you are playing on the beach and make four sand piles and then you make three other sand piles in a different place, then how many sand piles would you have if you put them all together? (1)

In the Smith family there are seven brothers. Each brother has one sister. Including the parents, how many are in the family? (10)

How many times can you subtract 2 from the number 21? (Once)

When you take two apples from three apples, what do you have? (2 apples)

<u>Telephone Telepathy</u>

In your calculator…

Key in the first 3 digits of your phone number. (not the area code)
Multiply by 80.
Add 1.
Multiply by 250.
Plus last four digits of your phone number.
Repeat that last step.
Minus 250.
Divide by 2.

<u>The result is your phone number!</u>

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 10 – *Warm-Up – 2-24 – Math Smart – Expressing Decimals as Fractions*

<u>Essential Question:</u> What do I need to do and understand, to be successful on my Chapter 2 TEST?

<u>Objective(s):</u> All covered in Chapter 2

<u>"SAP":</u> Students will divide into 6 teams to do interview.

<u>Lesson Anatomy</u>: Check homework – clarify and solve any problems that posed difficulties to students. Together, work through TE pg. 126 # 52 - 71

<u>Summarizing Activity:</u> Assign students to 1 of 6 teams (5 -6 per team). Choose 12 questions from the text that are suitable for test review. Each team is to assign two problems per team member to solve. When teams are finished with questions, rotate to get answers, using the other teams to challenge or agree. Ask students not only for the answers, but a brief "process" explanation as well, verbally or by diagram. (Students may collaborate to ensure their success.)

<u>Homework:</u> Review Puzzle (see attached)

<u>Homework Puzzle</u>

Name: ________________ **Date:** ________

$-5 + \frac{b}{4} = 7$ _______	$-12 = 6 + \frac{3}{4}x$ _______	$n + 3(n-2) = 10.4$ _______
$2(1-2y) = 4y + 18$ _______	**Which equation has -2 as its solution?** a) $4x + 2 = 5$ b) $4x - 2 = 5$ c) $4x - 2 = 5x$ d) $4 - 2x = 5x$	**If** $m = \frac{t}{b-a}$**; solve for "t** ______
If the ages of the Drama Club Members are: 14, 18, 16, 15, 17 14, 15, 18, 15, 13, 14, 15, 18, 14, 17, 16, 14, 16 … Put the data in a stem-and-leaf-plot.	**What is the *mode* and *median* age?** ________	**What is the "*mean"?* To best describe the central tendency of the data, would you use the "mean" or "median"?** ______________________ **Why?** ________
You spend half your allowance each week on school lunches. Each lunch costs \$1.125. How much is your weekly allowance? _______	**Simplify:** $6c + 2(4c-3) = ?$ _______	$\begin{bmatrix} 4.2 & 0.6 \\ 1.7 & 9.5 \end{bmatrix} + \begin{bmatrix} 5.8 & -3.5 \\ 0.2 & 4.9 \end{bmatrix}$ ________

Day 11 – *Warm-Up – Algebra with Pizzaz – pg. 27 (formulas)*

<u>Essential Question:</u> How do I graph points on a rectangular coordinate plane, and exactly what is a "relation"?

<u>Objective(s):</u> 3.03 Create linear models for sets of data to solve problems.
4.01 Use linear functions or inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic expressions.

<u>"SAP":</u> Students will be instructed to pick up 2 index cards with the numbers 1-4 on a side (one number per side), as well as one ordered pair. They will be manipulating these with their hands during the magic "imaginary" rectangular coordinate graphing activity. This will be followed by a "paired" activity to create and illustrate a product that depicts and teaches what a "relation" is, and the 4 ways to show it.

<u>Lesson Anatomy</u>: Homework check/ Chapter Test return and discussion. Introduce lesson by asking students if they have seen a map of Greensboro. Show one to students, front and back. Ask them, "what is around the four sides of the map on both sides?" Show them how letters and number form a grid. Ask how they think this is useful if someone is new to the city? Tape the map to the board and illustrate how to find the "coliseum", "Bryan Park", A&T University, their high school, and Bur Mil Park. Explain to students that in algebra, the rectangular coordinate system is a grid that is divided into 4 equal sections called "quadrants". Share that the 4 quadrants are created by the intersection of two lines called the "x" axis and the "y" axis. Have them demonstrate with you, using their right hand in the air, that the "x" axis runs horizontally (draw an imaginary line), and the "y" axis runs vertically (draw an imaginary line). Students should have prior knowledge, so then ask what the location is called where the two lines cross or intersect at a 90 degree angle? Answer: the origin. Explain that an "ordered pair" (hold up an example – (3, 7)) identifies every point on the plane. Ask, "what does the first number represent in the ordered pair? The second number? Reinforce that the first number always tells your hand and eyes to move right or left, and the second number always tells your hand to move up or down, last. Introduce students to your "*imaginary*" grid. With vocal sounds, draw the "x" and "y" axis. Ask a few of the students to stand and call out their order pairs, one at a time. The teacher demonstrates how to find them on the imaginary grid. Call on another group of students to stand with their ordered pairs. This time as you graph each one, make a mistake…are the students realizing what your errors are and correcting your movements? Next, call out several ordered pairs encouraging students to listen to what you are saying. After each one, allow 5 seconds to hold up appropriate index card, 1, 2, 3, or 4, to silently show what quadrant the spoken pairs are in. This will give you a quick assessment as to their understanding of locating ordered pairs correctly. Collect index cards and ordered pairs. Next…pair students and pass out one sheet of construction paper and one manipulative packet.
Hold up poster board – *"Calories per Serving of Some Common Foods"*. Show how

the information in the poster can be translated into a SET of ordered pairs that have "what" relationship? (Response should indicate that each pair contains the number of fat grams, and the number of calories. Explain to students that the "x" values can represent the fat grams and the "y" values the calories. Share with students that when you have a SET of related ordered pairs, in algebra, that is called a *"relation"* . Have students write the relation as a set of ordered pairs, in box one, on their construction paper. Emphasize the 'look' of the brackets. Tell students that this is only one way to illustrate a relation, but in fact, there are 3 other ways. In box 2, have one student glue the two pieces of string beside each other like a lasso, leaving 1½ inches between the lassos. Explain that the left lasso represents the "x" values from each ordered pair (OP) and the right lasso, the "y" values. Have the students write the values in the appropriate lassos. Explain that if a number is repeated more than once, in either lasso, to only write it one time. Ask students to recall, whether the left lasso is the "x" or "y" values. Tell them that in a relation, we refer to all the "x" values as the domain of the relation, and the "y" values as the range. Have them record the words under the correct lasso values. Move to box 3. Tell students to take out the 16 bingo markers, the colored dots, and the 2 toothpicks, from the packet. In box 3, glue the 2 toothpicks like a T-chart. Then, one person can take 8 bingo markers plus 8 colored dots. The other person, the remaining eight of each. One person is to write the domain values on each of the 8 dots and their partner, the range values. Stick on markers and then glue markers under the correct side of the T-chart. Tell students that when expressing a relation in this way, they must account for each domain and range value, unlike a mapping. Tell them box 3 represents a "table", the third way to show a relation. Lastly, explain that box 4 shows the last way to depict a relation, and that is by graphing the ordered pairs – simply by showing a dot. Have them glue the grid plane in box 4. Explain that since the range values are spread so far apart, they will only graph the "x" values accurately on the grid, and simply record what the matching "y" values are as each OP is graphed. Remind students to place both their names on the construction paper, before turning in.

Summarizing Activity: Students are to number off 1,2,3…1,2,3…Gather the 1's together in one corner of the room, the 2's in another, and the 3's in another. Tell members of group one that they are to come up with a concise definition of: rectangular coordinate plane, quadrant, and origin. Group 2 members are to best define what a relation is, the "x' and "y" axis, and quadrants. Group 3 are to describe the four ways to illustrate a relation. Allow 5 minutes. Then, have students form new groups, each with a number 1,2, and 3 member. Take turns sharing their defn. and/or explanations. Repeat 3 times in different groupings (5-6 min. total).

Homework: From the book, Graphing is Fun – graphing activity "Rainy Day"(p 9.) *or* any Cartesian plane "make a picture" activity that you have in your files.

RELATIONS

Name: ____________________ **Name:** ________________

Box 1

Box 2

Box 3

Box 4

So

Food	**Grams of Fat**	**Number of Calories**
Whole Milk	**8**	**150**
Chicken	**4**	**90**
Corn	**1**	**70**
Ground Beef	**10**	**185**
Eggs	**6**	**80**
Ham	**19**	**245**
Broccoli	**1**	**45**
Cheese	**9**	**115**

Day 12 – *Warm-Up – Algebra with (Pizzaz pg. 28) Moving Words Puzzle*

<u>Essential Question:</u> How can I tell if the relation is a "function" by examining the domain, range, and/or picture (graph)?

<u>Objective(s):</u> 4.01 Use linear functions or inequalities to model and solve problems; justify results. a)solve using tables, graphs, and algebraic expressions.

<u>"SAP":</u> Students will work in pairs to do <u>To Function or Not to Function</u> activity.

<u>Lesson Anatomy</u>: Collect homework graphs. Review by putting the relation $(3,0),(0,-1),(-3,2),(3,2)$ on the overhead. Ask students to state what the domain and range of the relation are. Ask students to explain and record in their notebooks, the other three ways to illustrate the information. Explain that a "function" is a relation that assigns only ONE value in the range to each value in the domain. So what does that mean? Explain that many things in life operate as functions. For example, when I put money into my bank account my balance increases. As the temperature in the air decreases, the liquid water in a bucket freezes. The older your car gets, its worth or value decreases. The more gas I put in my car, the farther the distance I can travel. Refer back to the above relation. Explain that one way to tell if a relation is a function is to perform the "vertical-line" test. Put on the overhead, example 2 (TE pg 242) – demonstrate how to move the pencil across the graph from left to right, pointing out that for each "x" value there is only one "y" value. Also, show students how to tell from a mapping of a relation (see if <or >appears – a "less than" sign means it's NOT a function). Tell students you are going to "think aloud" another example, and you want them to listen carefully.

Write the relation $(4,-2),(1,2),(0,1)(-2,2)$ on the overhead. Plot the points on the graph and perform the vertical line test, followed by mapping and observing. Check for understanding. Students will get into pairs to collaborate on completing the Activity – "To Function or Not to Function"? (5-7 minutes for students to complete). Check answers and have students explain their decisions.

Next, place "function rule machine" on the board (large construction paper size of diagram on top of TE pg. 243) Work through describing example of y = 3x + 4 to get table of values. Create additional tables for y = -2x – 4 and y = 5x + 1, using the input/output machine. Lead to description of "functional notation". Reinforce, that f(x), which represents the output, can be described using any lower case consonant – ex. h(x), j(x), g(x). Demonstrate how to substitute into the equation(s) TE pg. 243 examples 4 & 5.

Summarizing Activity: **Ticket-Out-The-Door – Pass each student a ticket. On it, they must look at the following table:**

Age	Weight
14	120
12	110
18	126
13	125
16	124

State the domain, range, and map to determine if it's a function. Turn in as they exit.

Homework: **Textbook pg. 706 #5 – 17 (odds only)**

To "Function" **or** ***"Not to Function"***

Group Names: ________________________________ **Date: ______________**

Determine if each relation is a *function*, by mapping.

1. $(3,7),(3,8),(3,-2),(3,4),(3,1)$

Answer: _____

2. $(6,-7),(5,-8),(1,4).(5,5)$

Answer: _____

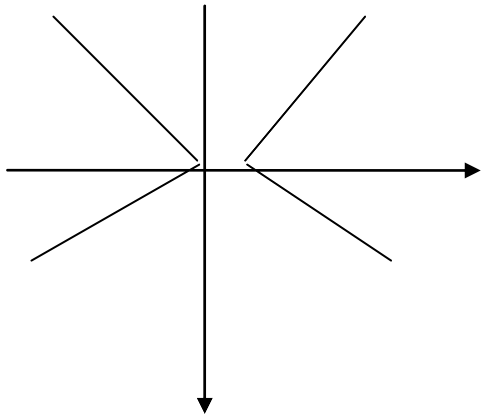
3. $(0.04,0.2),(0.2,2),(1,5),(5,25)$

Answer: ______

4. $(4,2),(1,1),(0,0),(1,-1),(4,-2)$

Answer: ______

Are the following diagrams "functions"? Put "yes" or "no" on the line provided.



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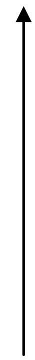

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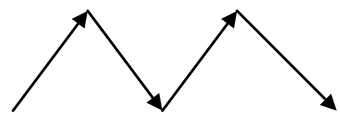

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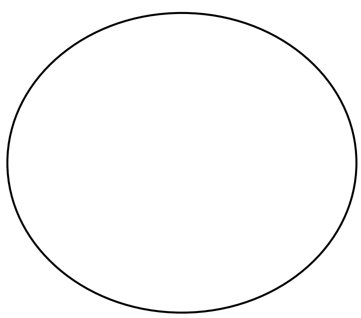

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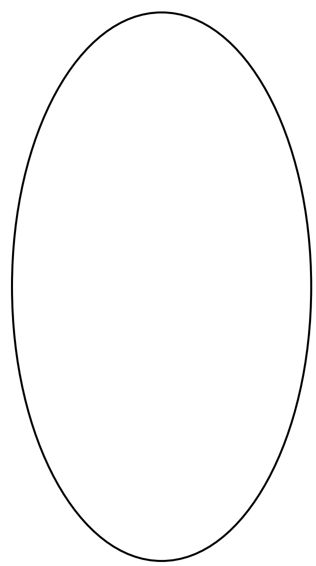

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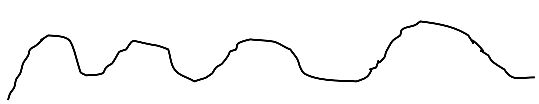
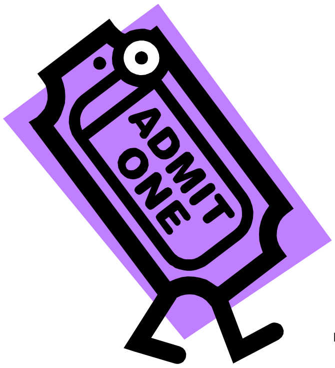
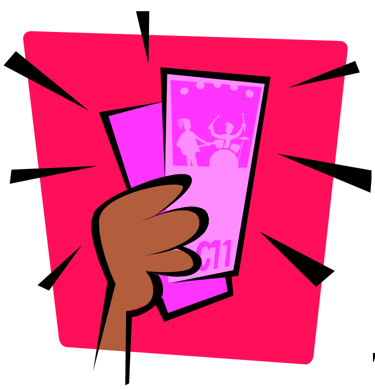
 ______

Make copies of this for use in other lessons.



Ticket- Out- The- Door

Look at the following problem. Be prepared to tell me the first and last steps in solving the problem.



Ticket to Leave……….

Write one question about today's lesson – something that may have you "puzzled".

Day 13 *Warm-Up – Math Smart – pg. 265-266-Creating a Bar Graph*

Essential Question: **How do I model the "function rule" in a table of values and a graph?**

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties.

"SAP": The students will be following along on the "Functions Rules!" colored worksheet packet. The teacher will model several *"think alouds"*, followed by the students working with a partner to solve 3 questions. Then, the last 2 questions, the students will complete individually. (Me, We, Two, You).

Lesson Anatomy: Review by putting the following on the overhead:

$(4,2),(2,3),(6,1)$ **,** $(-3,-3),(-3,4),(-2,4)$ **, and** $(-1,0),(1,0)$ **. Have students map to determine if they are each functions. Also, given f(x) = 2x – 4 and g(x) = x^2 - 4x, find the values of: f(-5), and g(¼). Remind students of the input/output machine that the** "input" **is what is substituted in for the domain (x), and the** "output" **is the range (y) values. The function rule shows how the variables are related. The domain values are the "independent" variables and the range, "dependent" variables.**
Tell students we are going to examine three views of a function. Pass out Function Rules! colored packet. This is to be completed by the end of the class.

Summarizing Activity: Back-to-Back. Have partners stand back-to-back. Instruct the class that you will be asking a few multiple choice questions. If they think the answer is A, they are to hold up one finger. If B, then hold up 2, and if C, hold up three. After each member has made their decision (allow 10 seconds), when I say turn, they will face their partner to identify if the same number of fingers are showing. If they are, celebrate with a high-5. Clarify any errors.

Questions: 1. Relations can be expressed as a) dots on a number line, b) a mapping, or c) a bar graph – Answer b.
2. A function can be shown from a) a table of values, b) a graph, or c) each of these. Answer c. 3. A function that is shaped like a parabola means a) "x" is squared, b) "y" is squared, or c) the x values are absolute. Answer – a.

Homework: Pr. 5-3 #2 – 26 (evens only)

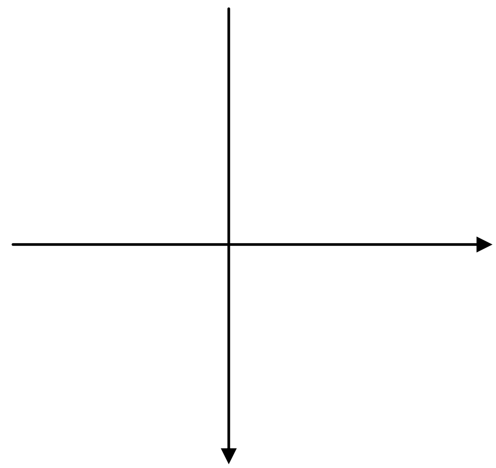
Function Rules!

Name: ____________________ Date: ____________

Model #1

(ME)

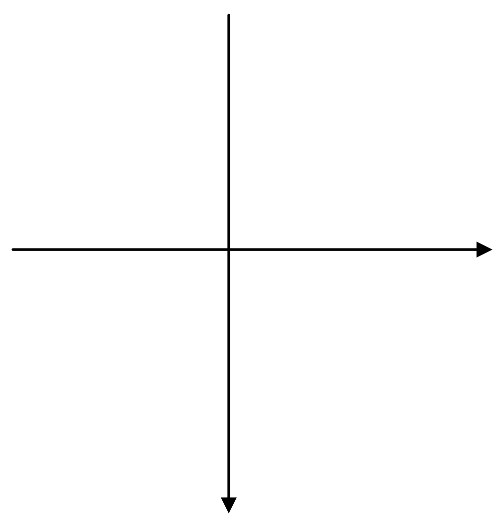
"x"	$y = \frac{1}{2}x + 3$	"y"	(x,y)



Model #2

(WE)

"x"	$y = \lvert x \rvert + 1$	"y"	(x,y)



Model #3

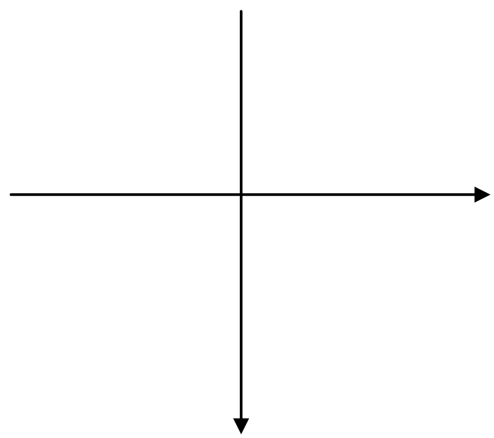
(WE)

“x”	$f(x) = x^2 + 1$	“y”	(x,y)

Partner

(TWO) With your partner, model each rule with a table of values and graph.

“x”	$f(x) = -3x$	“y”	(x,y)

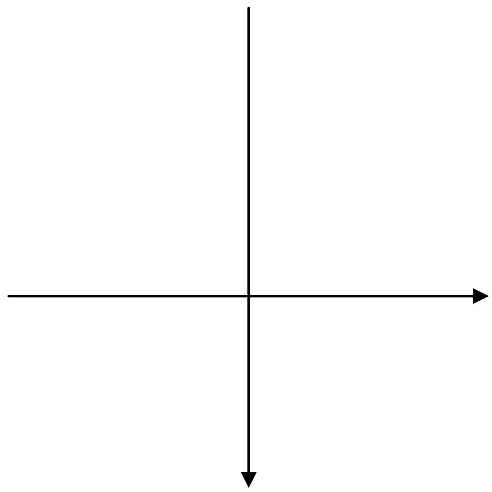


(WE)

“x”	$f(x) = -3x + 1$	“y”	(x,y)

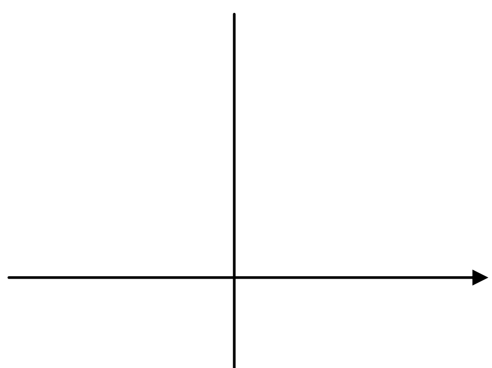
(WE)

“x’	f(x) = $\frac{1}{4}$ x + 2	‘y”	(x,y)



<u>YOU!!!</u>

‘x”	f(x) = 5 + 4x	“y”	(x,y)



Algebra I Lesson Plans for Block Schedule

Day 14 *Warm-Up – Algebra with Pizzaz – pg. 175 (Reviews functions).*

<u>Essential Question:</u> How do I write an equation (function rule) from a pattern observed in a table?

<u>Objective(s):</u> 4.01 Use linear functions or inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties.

<u>"SAP":</u> Students will get into groups of 4. From an envelope, one person will pick two examples for their group members to solve. Students are to complete the next two members in the pattern and write an equation for each relation. Those examples that can be chosen are: Have volunteers from each group, solve one of their choices. Check for understanding at the end of each solution.

x	**-2**	**-1**	**0**	**1**	**2**	**3**
y	**10**	**7**	**4**	__	__	__

x	**2**	**4**	**6**	**8**	__	__
y	**5**	**9**	**13**	**17**	__	__

x	**2**	**4**	**6**	**8**	__	__
y	**4**	**10**	**16**	**22**	__	__

x	**0**	**1**	**2**	**3**	**4**	**5**
y	**3**	$\frac{12}{5}$	$\frac{9}{5}$	$\frac{6}{5}$	__	__

<u>Lesson Anatomy</u>: Homework check. Check Warm-up. Put the following examples on the overhead.

1) **3, 7, 11, 15, ___, ___**
2) **6, 4, 2, 0, -2, ____, ____**
3) **3, -1, -5, -9, ____, ____**
4) **1, 8, 27, 64, ____, ____.**

Ask students to identify the pattern. Show students the following table.

x	**y**
-4	**1**
-8	**2**
-12	**3**
-16	**4**

Provide students with a graph. Plot points. Draw a line through the points. Since these points form a "straight" line, there is a "linear" equation that describes the relation. Tell them, our purpose today, is to label the equation that matches the graph. To do so, we must find the pattern that exists between the changes in <u>"y"</u> over the changes in <u>"x"</u>. (Relate this back to slope). Observe: the change in "y" in

the table is (+1), and the change in "x" is +(-4) or-4. Therefore, the change in "y" over the change in "x" is $\frac{1}{-4}$ or -$\frac{1}{4}$! Therefore, we can predict that the equation that describes the table is y = -$\frac{1}{4}$x. To prove this is correct, substitute values from "x" in the equation, and see if you get the desired "y" results that match. Prove this example is correct. Observe the next table.

x	1	2	3	4	5
y	6	12	18	24	30

The change in "y" is _____? Over the change in "x" is $\frac{6}{1}$ = 6. Therefore, the equation of the line that describes the table is y = 6x. Prove by substituting in "x" values to get desired "y" values. It works, so the equation is y = 6x, that describes the table.

Repeat procedure for the following table.

x	1	2	3	4	5	6
y	-1	1	3	5	7	9

The change in "y" over the change in "x' is $\frac{2}{1}$ = 2, therefore, the equation should be y = 2x.

Show that in this example it does NOT work. When you substitute in the values of "x", you do NOT get the desired values of "y" from the table. But, the difference between the actual outcomes and the desired outcomes is -3 each time, therefore, the equation for the table is y = 2x – 3. Prove. It's correct!

For the last example, examine the following table.

x	1	2	4	5	6	9
y	8	6	2	0	-2	-8

Here, the change in "y" is inconsistent, and the change in "x" is +1.
Therefore, we need to find the ratio difference for each ordered pair. For example, the first ratio is $\frac{-2}{1}$ = -2. The next ratio is $\frac{-4}{2}$ = -2. The next one is $\frac{-6}{3}$ = -2. Since the ratios are the same, the difference in "y" values are -2 times the values. This suggests that the equation could be y = -2x. When the values of "x" are substituted into the equation, the desired "y" values are <u>10 more</u> than what the table "y" values

are, so the equation must be $y = -2x + 10$. Prove. It's correct!!!

<u>Summarizing Activity:</u> Thank the class for a job "well done"!! Celebrate their successes with endless praises!!!!

<u>Homework:</u> "Equations' Elations".

 # "Equations' Elations!" 

Write an equation for each relation.

x	-3	-2	-1	0	1
f(x)	4	4	4	4	4

x	-3	-2	-1	0	1	2
f(x)	3	2	1	0	-1	-2

x	-2	-1	0	1	2
f(x)	10	6	2	-2	-6

x	1	2	3	4	5
f(x)	5	7	9	11	13

x	-4	-2	0	2	4
f(x)	-4	-3	-2	-1	0

<u>Bonus!!!</u>

$(-3,3),(-1,1),(0,0),(2,2),(4,4)$

Algebra I Lesson Plans for Block Schedule

Day 15 *Warm-Up – Converting Decimals to Fractions, to Percent, to Ratio, to Equivalent Fractions, to the Inverse… (see attached)*

Essential Question: How do I write an equation of a "direct variation" and use ratios and proportions with direct variation to solve word problems?

Objective(s): 1.03 – Model and solve problems using direct variation.
4.01 – Use linear functions or inequalities to model and solve problems; Justify results.

"SAP": Students will work with a partner to summarize major concepts at the end of the lesson. Ticket out the Door – Find someone in the class who is about the same height. Take turns sharing what the direct variation equation looks like and what the "constant of variation" means in the equation. Support with examples.

Lesson Anatomy: Check homework and warm-up. The homework check will serve as a recap of yesterday's lesson. Explain to students that given the equation
y = x – 4, it is possible to create a table of values and a graph that match the function rule.

x	-2	-1	0	1	2
y	__	__	__	__	__

Explain to students, that all they need to do is to substitute in the domain values and perform the operation to obtain the range values. Conversely, look at the following table:

x	y
0	1
1	-4
2	-9
3	-14
4	-19

What is the function rule for the above table?
A) f(x) = x-5
B) f(x) = -5x-4
C) f(x) = 5x-1
D) f(x) = -5x+1

Lead into the investigation from TE pg. 261. Read aloud the scenario to the students, create the table, and graph the results. Discuss questions 1 -5. Share with students that an equation in the form y = *k*x, is a function of x, where $k \neq 0$. Explain that this function is a "direct variation". The constant is *k*, the coefficient of x. Constant means remains the same; constant of a variation means changing at the same rate. To tell whether an equation represents a direct variation, solve for y.

If "x" = 0, then "y" = 0. So, if the equation can be written in the form y = *kx*, it represents a direct

variation. Let's look at some examples.

1. **$5x + 2y = 0$ Solve for "y".**
   $2y = -5x$ Divide by 2.
   $y = \frac{-5x}{2}$ This is in y = kx form. The constant of variation is $\frac{-5}{2}$.

2. **$5x + 2y = 9$ Solve for "y".**
   $2y = -5x + 9$ Divide by 2.
   $y = \frac{-5x}{2} + \frac{9}{2}$ This is NOT in y = kx form, therefore, it is <u>not</u> a direct variation; a <u>proportion.</u> Continue to work through examples 1a., b., and c. (pg. 262)

Next, ask students to predict how they would write a direct variation equation that includes the point (4, -3)? Restate the generic equation of y = kx (the function form of a direct variation). Substitute in the "x" and "y" values.

$y = kx$

$-3 = k4$ Divide by 4. Therefore, $k = \frac{-3}{4}$ so, the equation is $y=\frac{-3}{4}x$!!

Ask students to write an equation of the direct variation that includes the point (-3, -6); (-3, 2). Conclude by illustrating "real world" example on page 263 (TE).

<u>Summarizing Activity:</u> Have students work with a partner to answer the following.

For the data in each table, tell whether "y" varies directly with "x". If it does, write an equation for the direct variation.

a.

x	y
-2	3.2
1	2.4
4	1.6

b.

x	y
4	6
8	12
10	15

Is each equation a direct variation? If it is, find the constant of variation.

$2y = 5x + 1$ ____________________

$8x + 9y = 10$ ____________________

$y + 8 = -x$ ____________________

$-4 + 7x + 4 = 3y$ ________________

$\frac{1}{2}x + \frac{1}{3}y = 0$ _____________________

Write an equation of the direct variation that includes the given point.

(-8, 10) ____

(6, -8) ____

Bonus: The amount of blood in a person's body varies directly with body weight. A person who weighs 160 pounds has about 5 quarts of blood.

a. **Find the constant of variation.**

b. **Write an equation relating quarts of blood to body weight.**

Check answers together before the end of class.

<u>Homework:</u> Pr. 5-5 (evens only)

Decimals to Fractions to Ratios to Percents……

Equals1	**Ratio**	**Decimal**	**Equivalent**	**Fraction**	**Percent**
				3/5	

					64%
				22/32	
			10/12		
		.06			
	9:18				
3/2					

Algebra I Lesson Plans for Block Schedule

Day 16 *Warm-Up – Algebra with Pizzaz – pg. 38 (reviews solving equations)*

<u>Essential Question:</u> What is "inductive" reasoning? How do I use it to identify number patterns and write rules for arithmetic sequences?

<u>Objective(s):</u> 1.02 Use formulas and algebraic expressions, including iterative and recursive forms, to model and solve problems.

<u>"SAP":</u> Note-taking – Lesson 5-6 Quiz.

<u>Lesson Anatomy</u>: Solve warm-up riddle and check homework. Clarify any concept difficulties.
Tell students to pretend they are driving along Cone Boulevard. They notice that the first three streets they pass are 15^{th}, 16^{th}, and 17^{th} Street. They could probably conclude that the next street might be ___th street? Share with the students that they arrived at the answer by drawing a conclusion based on an observed pattern. This is called *<u>inductive reasoning</u>*, and the conclusion that was drawn by this type of reasoning is called a "*conjecture".* Hold up laminated examples (5). Explain that the students were able to get the next two terms in the pattern by ____________ ____________. (Let them answer). Lead to the explanation that a number pattern is also called a "sequence**". One kind of sequence is an 'arithmetic' sequence. By adding or subtracting a fixed number to each of the previous terms, the** <u>common difference</u> **enables one to identify the next unknown terms in the pattern. Hold up laminated examples (5).**
Redirect students to the example 7, 11, 15, 19… Think of each <u>term</u> as the "output" and the <u>term number</u> as the"input". Explain that they can use the common difference **of the terms of an arithmetic sequence to write a function rule for the sequence. In this example, the common difference is (+4). So, let's define the variable:**

Let "n" = the term number in the sequence.
Let A(n) = the value of the *nth* term in the sequence. Then,

$A(1) = 7$
$A(2) = 7 + 4 = 7 + \underline{1} \cdot 4$
$A(3) = 7 + 4 + 4 = 7 + \underline{2} \cdot 4$
$A(4) = 7 + 4 + 4 + 4 = 7 + \underline{3} \cdot 4$…….So, *<u>A(n)</u>* $= 7 + 4 + 4 + 4 + 4 + \ldots + 4 = \underline{7 + (n-1)4}$!

Therefore, the rule is $A(n) = a + (n – 1) d$; where "n" is the "desired" term (ie. find the 11^{th} term in the sequence…); a is the <u>first</u> term; (n – 1), n is the term number; and d is the common difference.
Look at example #1:

Find the first, fifth, and tenth terms of the sequence that has the rule

A(n) = 12 + (n-1)(-2)

A(1) = 12
A(5) = 12 + (5-1)(-2) = 12 + (-8) = <u>4</u>
A(10) = 12 + (10-1)(-2) = 12 + (-18) = <u>-6</u>

On the overhead, work through examples 3 a. and b. from TE pg. 270.

<u>Summarizing Activity:</u> Students will complete Lesson Quiz 5-6 (see TE pg. 273)

<u>Homework:</u> Textbook – pg. 270 #3,6,9,12,15,17,18,21,22-32(evens), 61.

2, 5, 8, 11,
14, ______, ______!

20, 10, 5,
2.5, 1.25, ______,
______!

1, 4, 9, 16,

________, ________!

9, 15, 21, 27,

________, ________!

2, -4, 8, -16,

________, ________!

-7, -3, 1, 5,

________, ________!

17, 13, 9, 5,
______, ______!

11, 23, 35,
47, _____, _____!

8, 3, -2, -7,

________, ________!

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$, 0,

________, ________

P A T T E R N S

And

The Function Rule

Quiz 5-6

Name: _______________ Date: _____________

1. **Use inductive reasoning to describe each pattern. Then find the next two numbers in each pattern.**

a. 1, 2.5, 4, ___, ___ ______________________________________

b. ½, ¼, ⅛, ____, ____ ______________________________________

2. **Find the common difference of each arithmetic sequence.**

a. $-1, -\frac{-2}{3}, \frac{-1}{3}, 0,$ **____, _____**

b. 46, 34, 22, 10, _____, _____

3. **Find the second, sixth, and ninth terms of the sequence that has the rule A(n) = -3 + (n-1)(6).**

____

____

____

____

____

4. **Is -2, 3, 8, 10, … an arithmetic sequence? Explain**

____

____

____.

Algebra I Lesson Plans for Block Schedule

Day 17 *Warm-Up Algebra with Pizzaz – pg.181 (reviews constant of variation).*

Essential Question: How do I interpret, sketch, and analyze graphs from given situations? How can I prepare to do well on my Chapter 5 test?

Objective(s): 4.01, 1.03, and 1.02. (Objectives covered in the chapter.)

"SAP": Students will be involved in a "group" *rotating station* review. They may use each other, their textbook, and class notes (examples) to assist in completing each stations questions/activities.

Lesson Anatomy: Check warm-up and homework questions from textbook. Prepare a mini-lesson on "relating graphs to events". (TE pgs. 236-239) Ask students to recall that in their beginning discussion of defining "functions", they gave many real world examples – recall. Explain the importance of being able to look at situations (graphs) to interpret and analyze the information they represent. Graphs are pictorial representations of situations, so being able to understand what they are telling us is vital to understanding the story behind the picture. Draw, demonstrate, and discuss several text examples.

Chapter Review: Divide the class into 5 groups. Explain to students that they are going to participate in a "revolving review" that will be timed. Assign each group to their *starting* stations, located at various locations around the classroom. Share that each station will review concepts from each of the lessons covered in the chapter. They will need a pencil, a colored sheet of construction paper divided into 6 six equal parts, and a calculator. When I say "begin", the students will be given ten minutes to complete the station assignment, before rotating to the next one. Each group will rotate through all six stations. Students can use each other as resources; ask questions to their group members, or refer to their textbook and/or class notes at their desks. Tell them not to get "bogged" down on a particular question, but try to attempt all questions at each station. (See attached station problems/activities that will be laminated on poster board for continued use each semester.) Check answers after rotations are completed.

Summarizing Activity: Reading and Math Literacy chapter vocabulary crossword puzzle. Students can work with a partner.

Homework: Practice Chapter Test – textbook – pg. 278 #2-32 (evens)

“ROTATING” REVIEW

Chapter 5 – Graphs and Functions

Station One! **(On your mark, get set, GO…)**

Tear the following sheet and staple in box 1 on your sheet of construction paper. Follow the directions. (Make enough copies of the following matching activity and staple to the poster board.)

Vocabulary Review – “*What’s My Word?”*

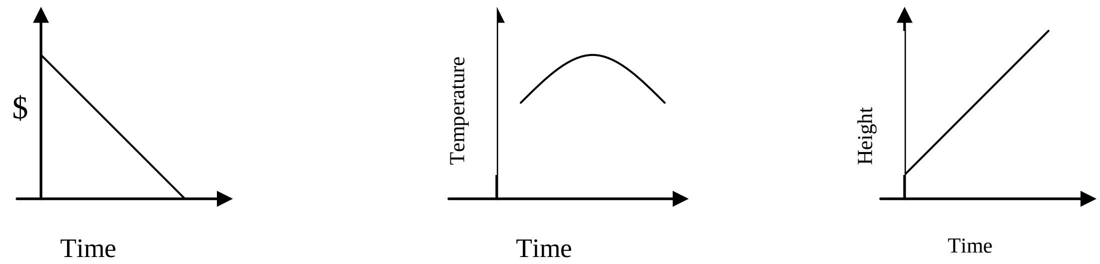
Match the vocabulary term in the column on the left with the most specific description in the column on the right. Connect the matching dots.

direct variation •	**• “x” coordinate**
inductive reasoning •	**• “y” coordinate**
independent variable •	**• a function that can be expressed in the form y=kx, where k $\neq$ 0**
function •	**• drawing conclusions based on observed patterns**
range •	**• a relation with exactly one value of the *dependent* variable for each value of the *independent* variable**
sequence •	**• a conclusion based on inductive reasoning**
conjecture •	**• a number pattern**

Below this, put the following on the poster board.

A graph shows a visual representation of the relationship between two sets of data.

Describe a situation for each graph.



Sketch a graph of each situation. Label

a) the number of customers in a restaurant each hour of one day

b) the height of a sunflower over a summer

c) a car traveling at 35 mi/hr accelerates to 55 mi/hr

Station Two!

Fill in the blanks.

1. **A _______________ is set of ordered pairs.**
2. **A ___________ ___________ is an equation that describes a function.**
3. **When a function is described in terms of f(x) as its output, it's said to be in**

   ____________________ _______________.

If the domain is $-4, 0, 1, 5$ **for each of the following functions, what are the range values?**

4. **y = 4x – 7**
5. **p =** q^2 **+ 1**
6. **w = 5 – 3z**

Determine if each relation is a function. Y = yes; N = no.

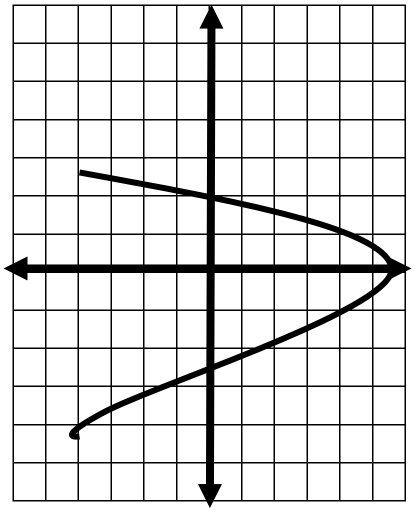
7.

X	Y
0	1
1	2
2	3
1	4

8.

X	Y
2	-3
-1	-3
0	-3
5	-3

9.



Use the vertical line test to determine if the graph above is a function. Yes? / No? Why?

Write a "function rule" (equation) for each table of values.

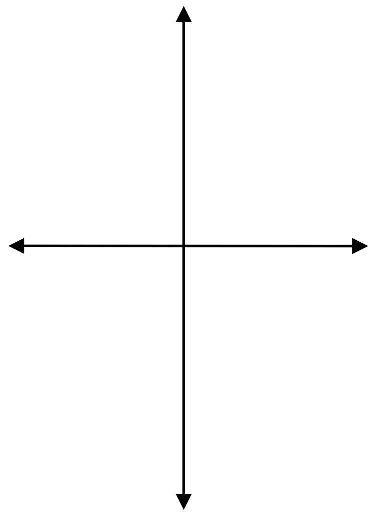
10.

X	**2**	**4**	**6**	**8**
f(x)	**3**	**5**	**7**	**9**

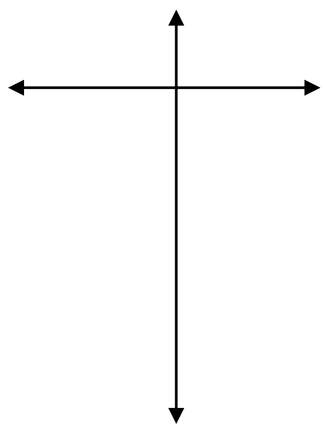
Station 3!

When you graph data on a grid the(1.)____________________ ______________ is the horizontal axis and the (2.) ___________________ _________________ is the vertical axis.

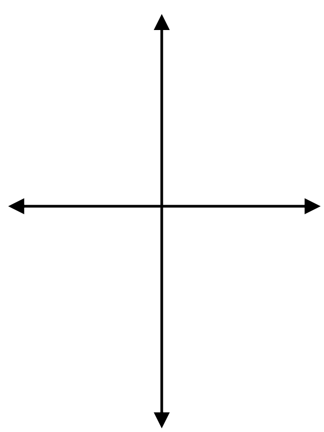
Model the function rule with a table of values and graph. (3.) $f(x) = -\frac{1}{2}x - 3$



(4.) $y = |x| - 7$



(5.) y = 2x + 1



***Station 4*!**

A function is a "direct variation" if it has the form __________, where k ≠ 0.
The coefficient *k* is the ____________________________.

Are the following equations direct variation? Yes? No? If yes, find the constant of variation.

1. f(x)= -3x **2. f(x) = x – 3** **3. y = 2x + 5** **4. y =** $\frac{2}{5}$ **x**

_________ _________ ________ ________

Write an equation of the direct variation that includes the given point.

5. (5, 1) ___________________ **6. (-2, -2) ____________________**

7. (1,2) ___________________ **8. (-2, 6) ____________________**

For the data in each table, tell whether "y" varies directly with "x". If it does, write an equation for the direct variation.

9.

x	y
-7	14
-5	10
-3	6
-1	2

10.

x	y
-6	-2
-3	-1
3	2
6	1

11.

x	y
24	4
18	3
-12	-2
-6	-1

12. The number of kilograms of water *w* in the human body varies directly with the total body mass *b*. A person with a mass of 75 kg contains 54 kg of water. How many kilograms of water are there in a person with a mass of 95 kg?

Station 5!

Inductive reasoning is the process of making ________________ based on patterns you observe. A number pattern is called a ________________, and each number is called a __________.

An _________________ sequence is formed by adding a fixed number, the ______________ difference, to each term.

Use inductive reasoning to describe each pattern. Then, find the next three numbers in each pattern.

1. 99, 90, 81, 72, ___, ___, ___. ____

2. 5, 8, 11, 14, ___, ___, ___. ____

3. 12, 23, 34, 45, ___, ___, ___. ____

Find the common difference in each arithmetic sequence. Then, find the next 3 terms.

4. 9, 8½, 8, 7½, ___, ___, ___. ____________________________________

5. 1, 14, 27, 40, ___, ___, ___. ____________________________________

Find the third, eighth, and tenth terms of each sequence.

6. A(n) = -1 + (n - 1)2 ________________________

7. A(n) = 4 + (n – 1)3 _________________________

8. A(n) = 1.5 + (n – 1) 1.5 __________________________

Determine whether each sequence is arithmetic. If it is, find the next 3 terms,

9. 14, 21, 28, 35,… ______________________________

10. 16, -8, 4, -2,… ______________________________

Describe a situation that could be modeled by the equation y = 5x.

____!

Algebra I Lesson Plans for Block Schedule

Day 18 *Warm-Up – Math Smart – pg. 35 (Finding Factors of Numbers)*

Essential Question: Am I ready to do a great job on my Chapter 5 test, and what's ahead in the next unit of study?

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems.

"SAP": Students will be involved in filling in a graphic organizer that will introduce them to the upcoming algebra unit on graphing linear equations.

Lesson Anatomy: Check warm-up. Carefully check over homework and troubleshoot any problems.

Pass out "graphic organizer" that will give an overview of the upcoming chapter on graphing linear equations. This is designed to accelerate and promote student's thinking and questioning. Discuss the meaning of the word "*linear*", as it relates to equations and graphing (straight lines). Walk through organizer describing key "generic" forms of linear equations; standard form, point-slope form, and slope-intercept form. (see attached) When the organizer is completed, have the students glue it to a chosen color of copy paper. This will become a reference sheet for future lessons.

Students will then take their Chapter 5 test.

Summarizing Activity: Think-Pair-Share. Students will get with a neighbor to share one thing they found challenging about the test, and one thing they had the least trouble with! These will be shared when the tests are returned to the students.

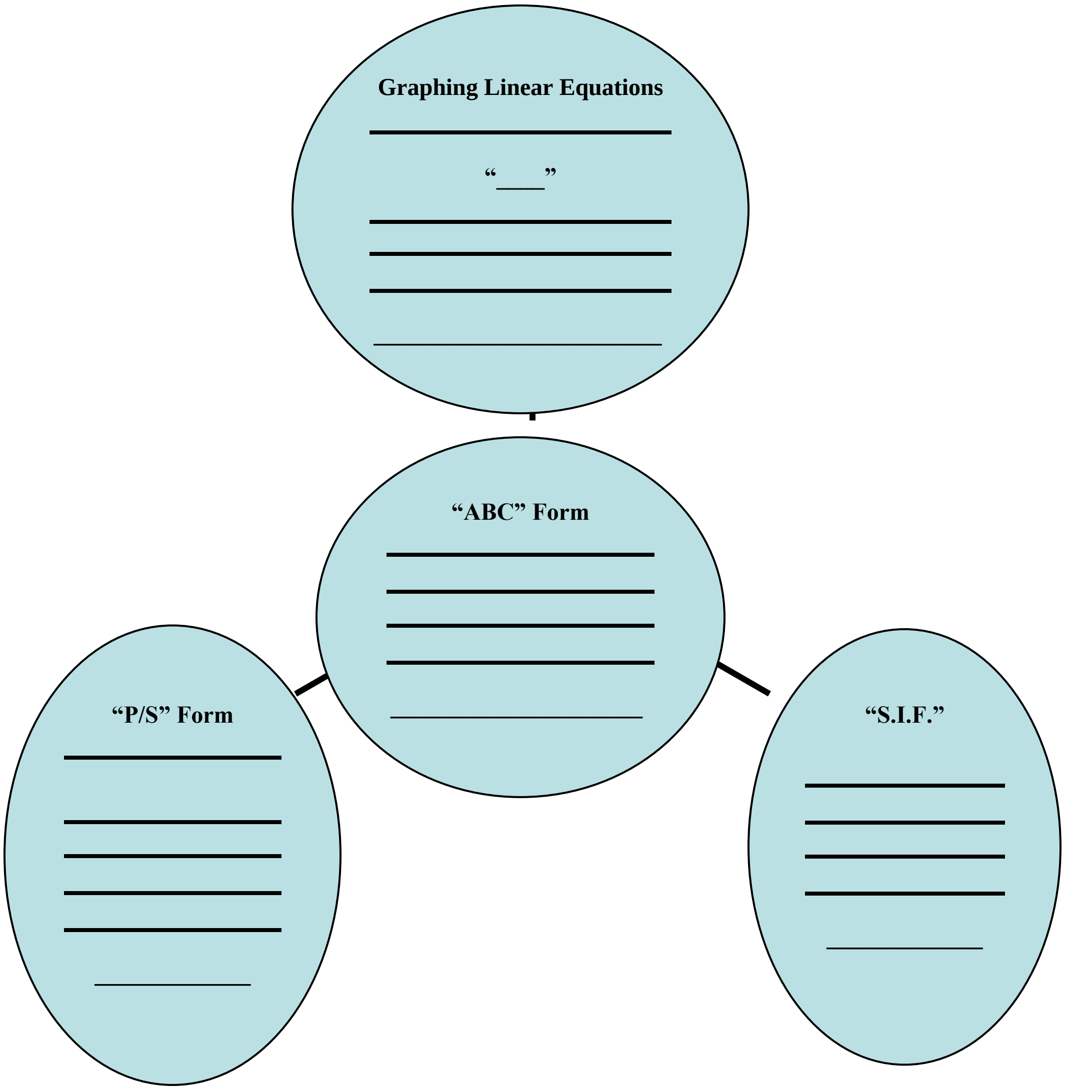
Homework: None (it's test day)!

"Sneak Preview"

Chapter 6

Graphing Linear Equations

Name: ____________________ **Date: ______________**



Day 19 *Warm-Up – Math Smart (pg. 291/292) Mathematicians and Their Achievements*

Essential Question: How do I find *rates of change* **from tables and graphs and how does it assist in understanding and finding the meaning of** ***"slope",*** **as it relates to algebra and equations?**

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems; justify results.

"SAP": The students will manipulate a "ski slope" grid to help facilitate the learning of the concept of slope, and the slope formula. They will then be involved in "Slalom Slopes, Anyone?" guided instruction.

Lesson Anatomy: Turn in warm-up. Pass back Chapter 5 tests and have a brief, general discussion. Students who have detailed questions will be invited to attend a tutoring session after school. Pass out the grid called "Slalom Slopes, Anyone?" Tell students that when you think about downhill skiing, you think of ski slopes – some are for beginners and some are for the more experienced skier. Ask where they think their level of expertise lies on the continuum. Tell students they are going to examine a ski slope. Demonstrate and explain that the grid is a 'pretend' ski slope and they are looking at a side view of a ski slope. Have students take their pencils to shade in characteristics of the slope (teacher will model), as shown in TE pg. 282. Number and label the grid axis.

Have students plot (0, 20), (20, 40), (50, 50), (80, 90), and (110, 100). Work through the 4 investigation questions. Develop from it, the concept of *rate of change***, and connect it to being a change in the dependent variable (y), over the change in the independent variable (x). On the second grid, work through ex. 2 (TE pg. 283). From there, do a 3rd example from "additional examples" TE pg. 283 #1; from a table determine if the rate of change for each pair of consecutive mileage amounts is the same. How do you know? From the examples, lead the students to the conclusion that the "slope" of a line is its** ***rate of change*** **, which is its**

$$\frac{\text{Vertical change}}{\text{Horizontal change}} = \frac{\text{rise (y)}}{\text{run (x)}}$$

From this conclusion, model an example of a positive slope, a negative slope, a "0" slope, and an "undefined" slope, all from examples on a grid. From these examples, develop the slope formula as $\frac{y_2 - y_1}{x_2 - x_1}$ **Lead students to "key concepts" conclusions. (TE pg. 286)**

Work through examples on applying the slope (m) formula, to coordinate points that fall on a line.

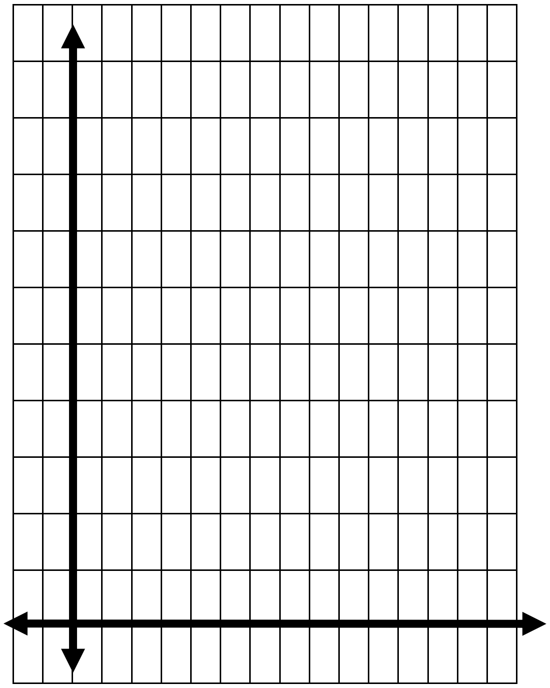
<u>Summarizing Activity:</u> Point-and-Go. Once students have a partner, they are to tell whether the following statements are true or false. **If** false, **tell why?**

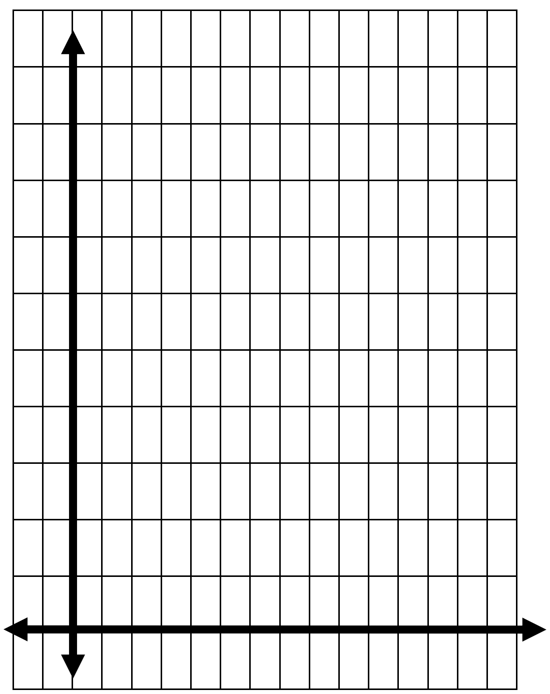
1) **A "rate of change" must be either positive or negative.**
2) **Two lines may have the same slope.**
3) **Two points with the same "x' coordinate are always on the same vertical line.**

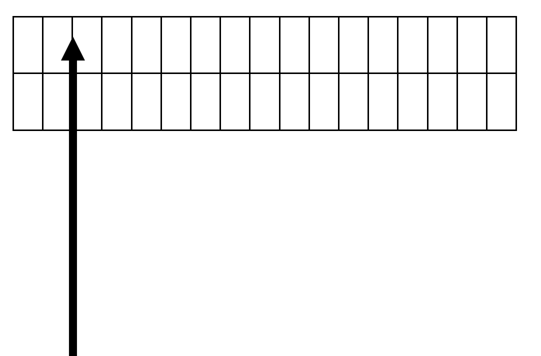
<u>Homework:</u> Textbook – pg. 288/289 # 62, 63-73.

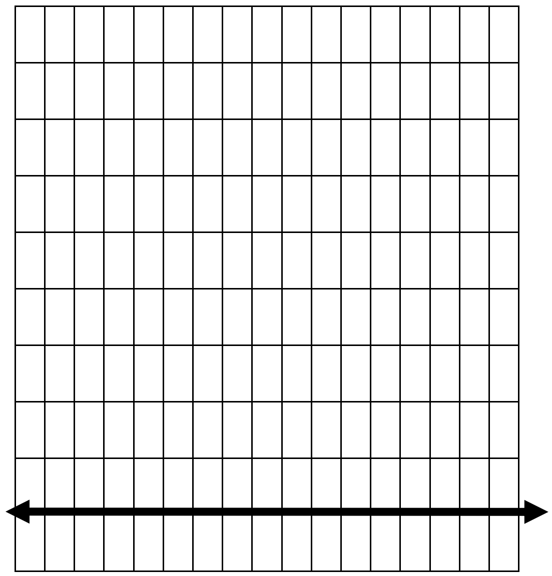
<u>"Slalom Slopes, Anyone?"</u>

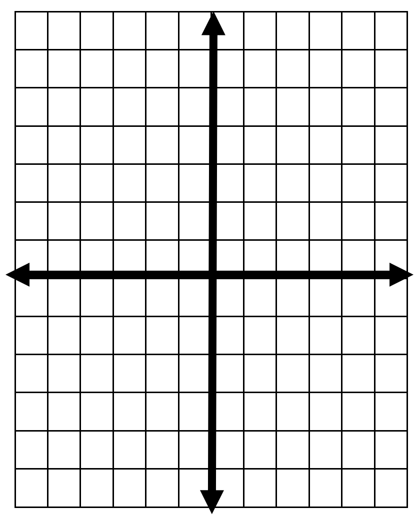
Name: ____________________ Date: __________

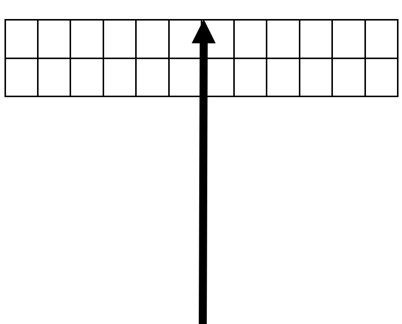


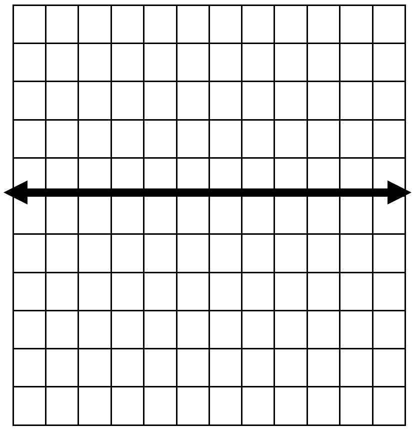


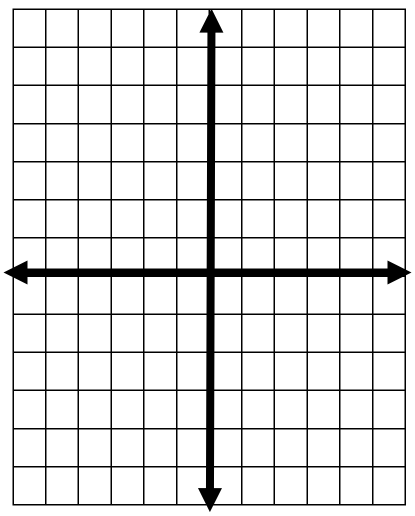


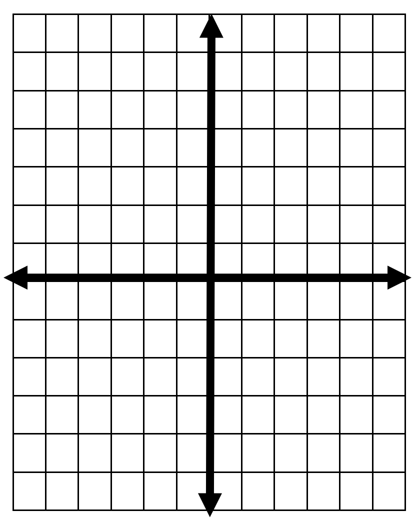












What if you are given the slope and a variable is missing in the coordinate pair?

Find “x” or “y”.

(2, 4), (x, 8); slope = -2

(x, 3), (2, 8); slope = - $\frac{5}{2}$

(-4, y), (2, 4y); slope = 6.

Algebra I Lesson Plans for Block Schedule

Day 20 *Warm-Up "Pattern Cross-Number Puzzle"*

<u>Essential Question:</u> How do I graph and write linear equations using "point-slope" form, and write equations using data?

<u>Objective(s):</u> 4.01 Use linear functions or inequalities to model and solve problems; justify results. b) Interpret constants and coefficients in the context of the problem.

<u>"SAP":</u> Students will make a 4-page foldable notebook to illustrate the graphs, equations, and tables from the lesson below.

<u>Lesson Anatomy</u>: Check warm-up and homework. Review solving the following slope problems. Find the slope if the line passes through:

(5,7) (-2,-3); (7,-4) (9,1); (.75,1) (.75, -1); Find the missing value.

If *m* = -4, and the line passes through (6, -2) (r, -6).
If *m* = -⅓ and the line passes through (9, r) (6,3).

Remind students to refer to their graphic organizer that introduced the chapter. Recall we identified that linear equations can be written and graphed in 3 different ways. Suppose you know that a line passes through the point (3,4) with a slope of 2. We can quickly write the equation of the line by going to the "generic" brand of *"point-slope form"*. Ask students to predict why? Lead them to the realization that if they know the "x" and "y" coordinates of the point and the slope *m*, it's just a matter of plugging the numbers into the correct parts of the form. So, if the "generic" brand is: $y - y_1 = m(x - x_1)$ (*point-slope form*), then, substitute.

"y" coordinate "x" coordinate

slope

$y \underline{-4} = \underline{2}(x - \underline{3})$ This equation is now in point-slope form!

How easy is that?! What if the line passes through the point (3, -3) and has a slope of -2?

The equation would be: $y - (-3) = -2(x - 3)$ Ask why this looks funny? (Remind students how the algebra "police" come out when 2 signs are written beside each other, so they need to take them to the bank and cash them in for 1 sign!) So the proper writing of the equation would be: $y + 3 = -2(x - 3)$.

Lead students to <u>how</u> they would graph the line from this equation form.

For example: <u>$y + 3 = -2(x - 3)$</u> Plot the point (3, -3) on the graph. Remind students that slope is the $\dfrac{\textit{change in y}}{\textit{change in x}}$**, so a slope of -2 is really $\dfrac{-2}{1}$.**

Therefore, from the point, move down 2, right 1, to locate a 2nd point. Draw the line

of the equation and verify its correct direction for a negative slope. Repeat procedure for the following:

***m* = -1; (-3, 5)**

***m* = $\frac{1}{2}$; (2,4)**

***m* = -$\frac{1}{3}$; (-3,-2)**

***m* = $\frac{2}{5}$; (-1,7)**

Then, ask students, "what if they are given 2 points on the line only? For example, write the equation for the line that passes through (2, 3) and (-1,-5). Recall the formula for finding slope:

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 3}{-1 - 2} = \frac{-8}{-3} = \frac{8}{3}$ **Plot the two coordinates on the graph, connect, and verify that the slope is correct. Repeat for example: (3,6) (-1,-2).**

Lastly, ask students to examine the following table:

x	y
-2	-2
-1	-1
1	0
2	1

Is the relationship shown by the data linear? If so, model the data with an equation in point-slope form, find the slope, and graph. Conclude with example 5 from TE pg. 306.

Summarizing Activity: The students will work with a partner to find "The Missing Link". Here, students will be asked to either, graph the equation, find the ordered pair(s)/slope, or write the point-slope form of the equation from one given piece of information.

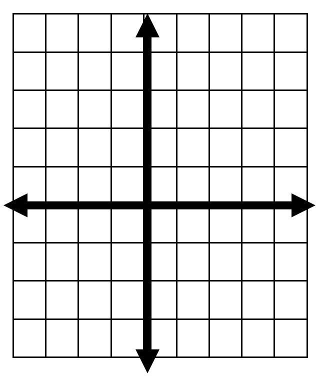
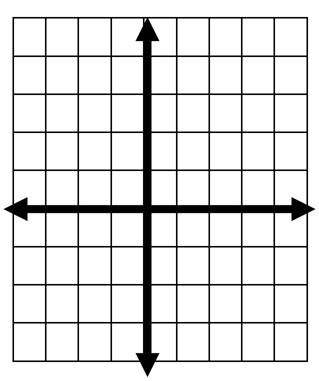
Homework: Textbook – pg. 308 #36-54 (evens only)

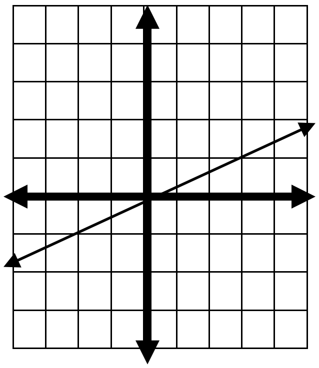
The "Missing Link"

Name: ____________________ **Date:** ________________

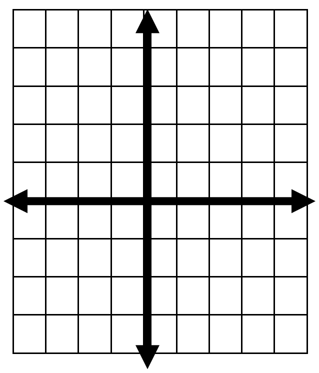
With a partner, find the 'missing link". Each problem below has 3 parts, 2 of which are missing.

Example: You are given, y – 5 = -(x – 1) – the ordered pair is (1,5) and *m* = -1. Graph.

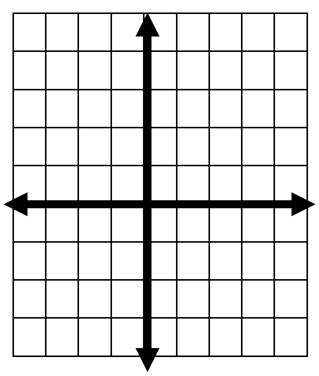
Graph	*Ordered Pair(s/Slope)*	*Point-Slope Eq^n*
	**(4,5) *m* = 2**	________________
	____________________	**y – 3 = -(x – 4)**



$y + 1 = \frac{1}{3}(x - 1)$



(0,1) (-3,-3)



Algebra I Lesson Plans for Block Schedule

Day 21 *Warm-Up "What's My Slope"? (see attached)*

Essential Question: **How do I convert "point-slope" form of an equation into "standard" form? What is standard form?**

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems; justify results. b) Interpret constants and coefficient in the context of the problem.

"SAP": On the overhead, write: $y + 3 = -2(x - 1)$, and, $y + 1 = \frac{2}{3}(x + 4)$. Ask students to think about what ordered pair is on each line of the equation and what the slope of each is. Also, ask students to predict what the coefficient is in each example. Then, have each partner describe how they would graph each equation. Later in the lesson, students will be graphing equations in Standard Form.

Lesson Anatomy: Check homework and warm-up. Share answers to the above questions in a whole group setting to ensure understanding. Ask students to recall back in the first week of class. They learned a variety of properties such as commutative, associative, etc. Tell students that as they look at these two problems, they just look unfinished in some way. Lead discussion to conclude that one could apply the distributive property to change the "look" of these *point-slope* equation forms. Have students write:

$y + 3 = -2(x - 1)$ $\xrightarrow{\text{"distribute"}}$ $y + 3 = -2x + 2$. Tell students that if they went to the *generic* algebra drugstore for a "standard" form prescription, it would look like: $Ax + By = C$. Ask students to examine both forms of equations. What is different from this new standard form compared to point-slope form? Lead students to conclude the variables are all on the left side of the equation. How can we move the -2x to the left side and the +3 to the right? JUST DO IT, but remember, you must change the sign to the opposite. Illustrate result to look like

$y \underline{+ 2x} = 2 - 3$ Therefore, $y + 2x = -1$. Tell students that something still looks a little different. Observe that in the generic standard form, the "x" variable is first, and the "y" variable is second, therefore when that change is made, it becomes…

$\underline{2x + y = -1.}$ Now it appears it is a match to the generic. Notice the number 2 in front of the "x". There is no number written in front of the "y", BUT we know it's understood to be the number? 1!!! Explain that the numbers written in front of the variables are called coefficients. Look at next example.

$y + 1 = \frac{2}{3}(x + 4)$. Ooh! This time we have a fraction to distribute. Ask students to think back to their distributive practice and equation solving skills. How can they get rid of ÷ 3? Multiply each part by 3. Remember, the $\frac{2}{3}(x + 4)$ is a team.

Therefore, $^3(y) + {}^3(1) = {}^3(\frac{2}{3})(x + 4) \rightarrow 3y + 3 = 2x + 8$ **after canceling and distributing.**
$\rightarrow 3y - 2x = 8 - 3$ **after moving variable(s) and numbers**
$\rightarrow 3y - 2x = 5$ **but, the "x" must come first**
$\rightarrow -2x + 3y = 5$ **this looks correct. But, share.**

Standard form *never* likes a negative number to lead it off – the "algebra" police are called in when this happens to correct the incident. To do that, you multiply every term in the equation by -1. That makes the *standard form* equation become:

$2x - 3y = -5$. So, in essence, we simply changed every terms sign to the opposite. Have students review writing point-slope forms of equations that pass through a given point, with an assigned slope (or 2 given points – find slope), and the convert them to standard form.

1. (-2, 7) $m = 2$ ____________________ ____________________

2. (-5,-3) $m = -\frac{2}{3}$ ____________________ ____________________

3. (-2,4) (3,6) ____________________ ____________________

4. (0,0) (-5,1) ____________________ ____________________

5. (1,6) (-4,0) ____________________ ____________________

Lead to "graphing" of linear equations from *standard* form. Materials are to be passed out by the resource students for each group. Work through TE pg. 299 illustrating *example 1* (finding "x" and "y" intercepts), *example 2*, *example 3*, "additional examples". Be sure to highlight for students what the equations and graphs look like, in standard form, when the slope is <u>0</u> or <u>undefined</u>. Time permitting, work through real-world example pg. 300.

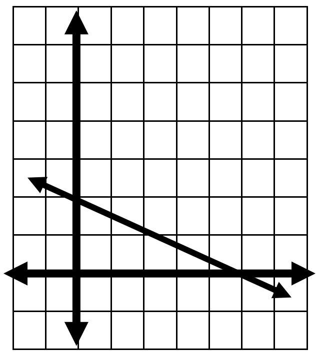
<u>Summarizing Activity:</u> **Students will complete Graph Scramble.**

<u>Homework:</u> **Pr. 6-3 (odds only)**

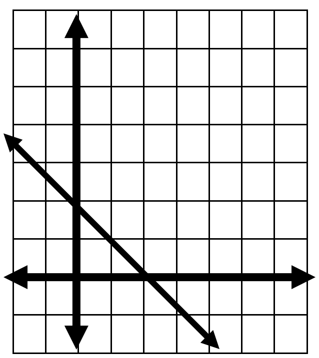
Graph Scramble

Cut out each graph and equations. Paste the correct equation with the correct graph on construction paper.

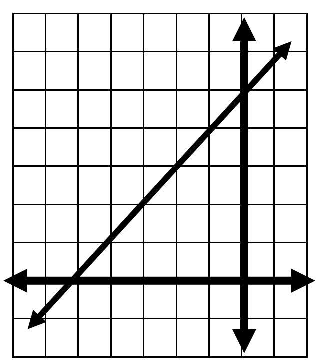
Name: ____________________
Date: ____________________



$5x - 3y = 15$

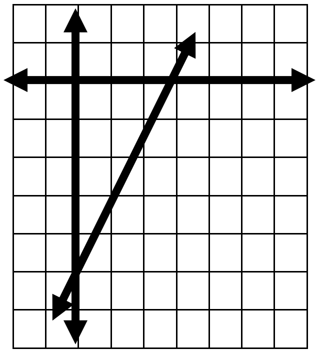


$0 + y = -2.5$

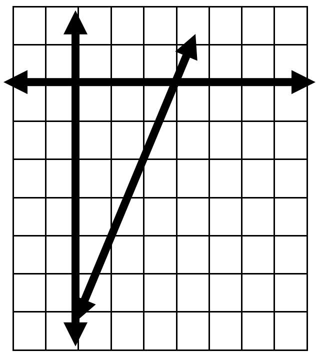


$2x - 5y = 10$

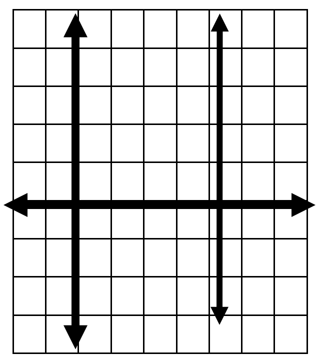
$x + y = 2$



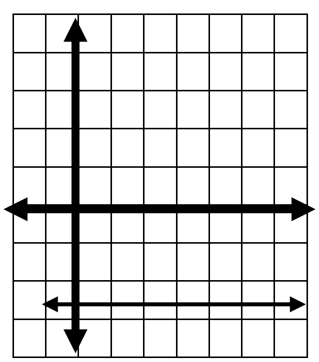
What's the missing equation?

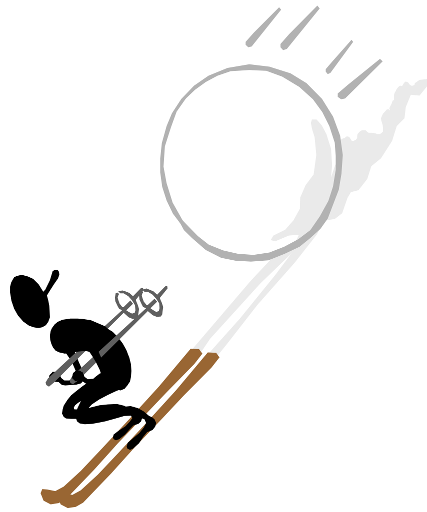


$-2x + y = -6$



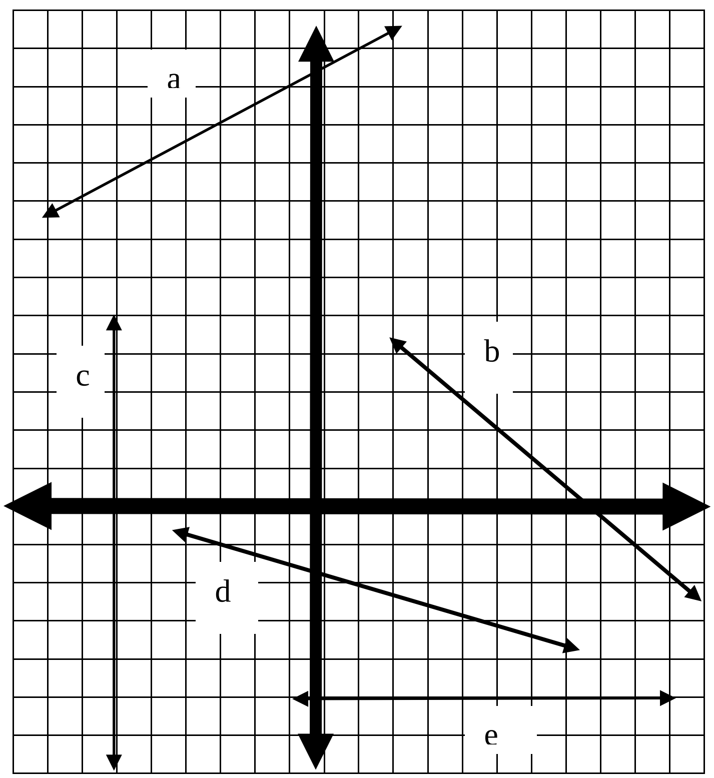
$x + 0 = 4.5$





What's My *"Slope"*?

Name: _______________



Slope

a) ______ b) ______ c) _____ d) _____

e) ______

Algebra I Lesson Plans for Block Schedule

Day 22 *Warm-Up Algebra With Pizzaz pg. 152 (reviews slope)*

Essential Question: How do I do well on my mid-chapter "quiz-er-oo", and how do I write and graph equations in "slope intercept form"?

Objective(s): Use linear functions or inequalities to model and solve problems; justify results. b) Interpret constants and coefficients in the context of the problem.

"SAP": Students will be taking a quiz and graphing equations.

Lesson Anatomy: Warm-Up and homework check. Students will take "Linear Equation Quizeroo" for the first part of the class.

After quizzes are completed, share with students that for the remainder of the period, they will visit the algebra "generic" drugstore for one last prescription.
Recall that they have a generic: point-slope form → $y - y_1 = m(x - x_1)$
standard form → $Ax + By = C$
Now, the last one is………..slope-intercept form → $y = mx + b$

Point out, that in this form, the equation is solved for "y". Only "y" is on the left hand side of the equal sign. Illustrate the following:

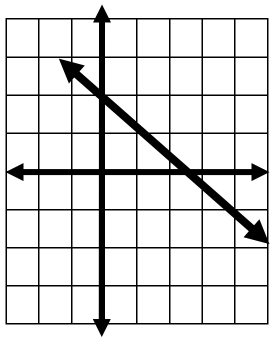
$$\underbrace{y}_{\text{y value}} = \underbrace{m}_{\text{slope}}\underbrace{x}_{\text{x value}} + \underbrace{b}_{\text{y intercept}}$$

Remind students that the y- intercept is where the line crosses the "y" axis on the graph. So, what is the y-intercept and slope of the equation $y = 3x - 5$? m = 3;b=-5
Think of it as being $y = 3x + (-5)$ if students ask why the b value is negative. Remind them they had to go to the algebra bank to cash in the 2 signs for 1. (+)(-) = -ve!

What is the slope of the equation: $y = \frac{7}{6}x - \frac{3}{4}$? $y = -\frac{4}{5}x$?

Write an equation of the line with slope $\frac{3}{8}$ and y-intercept 6. $y = \frac{3}{8}x + 6$.

What is the equation of the line in slope-intercept form.

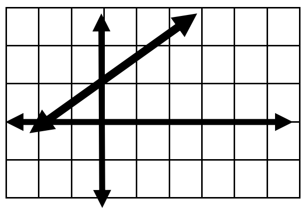


The line crosses the "y" axis at 2 (0,2), and at the intersection of (4, -1). Therefore, find the slope. $\frac{-1 - 2}{4 - 0} = -\frac{3}{4}$

y = mx + b Substitute the slope into the equation value and the y-intercept.

$y = -\frac{3}{4}x + 2$

What is the equation of the line?



y = mx + b Coordinates = (-2, 0) and (0, 1) Slope = $\frac{1}{2}$**, therefore** $y = \frac{1}{2}x + 1$

Pass out graph paper and have students graph:

$y = 3x - 1$ $y = \frac{1}{3}x - 2$ $y = -x + 2$ $y = 4x - 3$

<u>Summarizing Activity:</u> Share graphs with a partner to self-check.

<u>Homework:</u> Textbook pg. 707 #21-36

<u>Linear Equation "Quizeroo"</u>

Yippee…

Name: ________________

Date: ________________

Follow the directions and solve. Good Luck!

Determine the slope of the line that passes through each pair of points.

(-2, -8) (1, 4)   m = _____   "Do your figuring here."

(-5, 4) (-1, 11)   m = _____

Determine the value of "r" so the line passes through each pair of points and has the assigned slope.

(-2, 1) (r, 4) $m = \frac{3}{5}$ r = _____

(3, r) (7, -2) $m = \frac{1}{2}$ r = _____

Find the "x" and "y" intercepts of each equation.

4x + 7y = 8   x = _____   y = _____

$6x – y = -5$ $x =$ ______ $y =$ ______

Write the point-slope form of the equation that passes through the given point(s) and has the following slopes.

(5, -2) $m = 3$ ____________________

(-2, -4) $m = \frac{3}{4}$ ____________________

(0, 6) $m = -2$ ____________________

(-3, -4) (5, -6) $m =$ ___ ____________________

Write the standard form of the following equations.

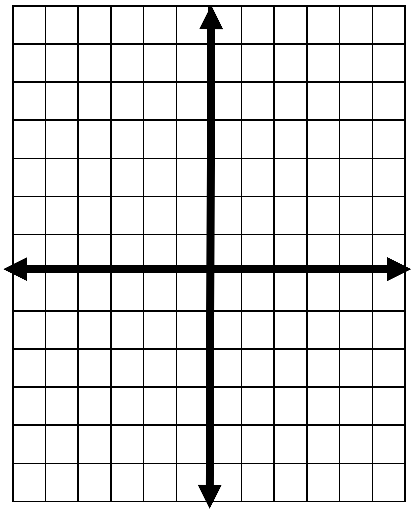
(-6, -3) $m =$ ____ ____________________

$y – 4 = -\frac{2}{3}(x – 5)$ ____________________

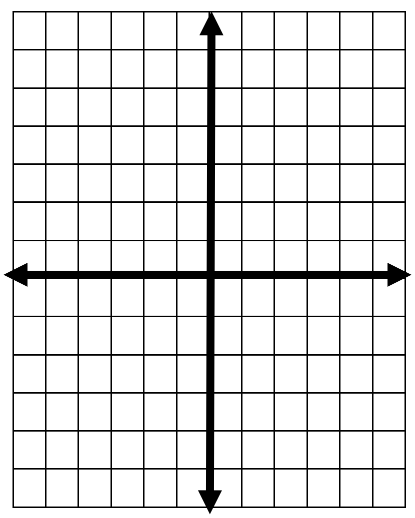
$y + 3 = -\frac{1}{2}(x + 6)$ ____________________

Graph the equations.

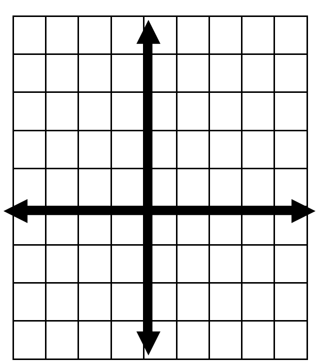
3y – 2x = 6



y – 4 = 2(x – 3)



4y + x = -2



Algebra I Lesson Plans for Block Schedule

Day 23 *Warm-Up- Students will write an equation in standard, point-slope, and slope/intercept form for a line that passes through (-5, -2) (1, -6).*

Essential Question: How do I keep all these ways to graph and write equations straight? I need more practice?

Objective(s): 4. 01 Use linear functions or inequalities to model and solve problems; justify results. Interpret constants and coefficients in the context of the problem.

"SAP": Students will be involved in a "human graphing" activity to review graphing concepts introduced over the past few days.

Lesson Anatomy: Number students off 123, 123…etc. Check homework by calling on group members to come to the board to solve questions after allowing time for group members to discuss answers. Check warm-up.

The remainder of the lesson will be a practice of writing and graphing equations. If weather permits, take class outside to cemented area. With colored chalk, draw a life-size grid (3 car lengths by 3 car lengths, with a scale for the "x" and "y" axis a yard apart. Have 10 different questions you want the students to "humanly" graph, laminated on poster board. Students can work in pairs to solve. Questions can look like:

x	y
2	3
3	7
4	11
5	15

Have students stand at each ordered pair junction. Is it linear? If so, what is the equation in point-slope form? Record answer.

x	y
-2	5
3	-5
7	-13
11	-21

Students stand at ordered pairs. Linear? Yes. What is the slope? What is the equation in standard form? Record answers.

x	y
-6	-5
-2	1
0	4
8	16

Have students stand on ordered pairs. Linear? If so, write the equation in slope intercept form. What is the y-intercept?

x	y
-4	1
2	4
6	6
14	10

Repeat student's movement on graph to ordered pairs. Write the standard, point-slope, and slope-intercept forms of the line that passes through each ordered pair.

Next three questions…select 2 students to stand at (1, 1) and (2, -2). Have 2 other students hold the ends of colored yarn that touch the two students standing. Have students observe. Ask: What is the slope? What is the "y" intercept? What are the standard, point-slope, and slope-intercept forms of the equation? Repeat with ordered pairs (4, -2) and (0, -3); and (-2, 0) and (2, 3).

The last 3 activities are for students to graph: $x + 3y = -3$

$$y - 6 = -3(x - 1)$$

$$y = \frac{2}{3}x + 2$$

<u>Summarizing Activity:</u> 3,2,1. List one reason why you liked the activity, one thing you learned that you were not sure of before, and who in the class you got to know and work with, that you didn't know that well.

<u>Homework:</u> <u>Algebra with Pizzaz</u> pg. 155. Puzzle reviewing Slope/Intercept form of equations and answers the puzzle question "Whom Should You See at the Bank If You Need to Borrow Money?

<u>Algebra I Lesson Plans for Block Schedule</u>

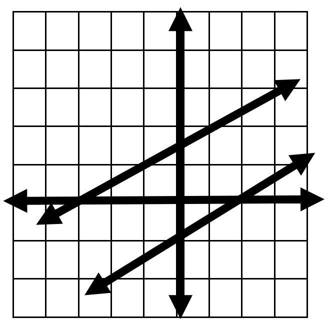
Day 24 *Warm-Up* *Pre-algebra with Pizzaz* *pg. 13 (reviews subtraction of integers)*

Essential Question: How can I determine whether a line is parallel or perpendicular to another given line of an equation?

Objective(s): 2.02 Use "parallelism" or "perpendicularity" of lines and segments to solve problems.

"SAP": Note-taking, graphing, and 6 section foldable.

Lesson Anatomy: Check and collect homework. Begin lesson with skills check TE pg. 311.
Show students the following graph.



The "x" intercept for the top equation is -3 (-3, 0) and the line goes through (1, 2). What is the slope? $\frac{1}{2}$ **The y-intercept crosses the "y" axis at** $\frac{3}{2}$**. The equation of the top line is y =** $\frac{1}{2}$**x +** $\frac{3}{2}$**. Look at the bottom line. It's slope is** $\frac{1}{2}$ **and the y-intercept is -1. Therefore, the equation for the bottom line is y =** $\frac{1}{2}$**x -1. Ask students what they observe about the lines on the graph? What is common to the equations? The slope! Share that 2 lines will be parallel to each other if their slopes are the same.**

Copy the following equations. y = -$\frac{1}{3}$**x + 5 and 2x + 6y = 12. How can I tell if they are parallel? Ask students to predict the next step. Lead answers to putting the 2nd equation into slope-intercept form.** $\frac{6y}{6} = \frac{-2x + 12}{6}$**, so the equation is y = -⅓x + 2.**
Ask students to tell why the two lines are parallel. Slopes are the same. Do 3rd example.

-6x + 8y = -24 and y = ¾x – 7. Parallel or not? _____

Tell students, "what if you were asked to write an equation for the line that contains

the ordered pair (5, 1) and is parallel to $y = \frac{3}{5}x - 4$. What do you know about m?

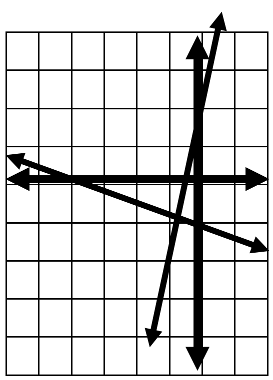
The slopes have to be the same, so the generic equation is $y = \frac{3}{5}x + b$. Substitute (5,1) into the equation with the slope. $1 = \frac{3}{5}(5) + b \rightarrow 1 = 3 + b \rightarrow b = -2$.

Place the ***slope*** and ***new*** y-intercept into the generic slope-intercept form and you'll get the line that is parallel. $y = \frac{3}{5}x - 2$

Do next example. (2, -6) and is parallel to y = 3x + 9. Answer: y = 3x – 12!

NEXT, ask students to graph the following.

$y = -\frac{1}{4}x - 1$ AND $y = 4x + 2$



Notice that the lines are perpendicular to each other. What is the relationship of the slopes -¼ and 4? Lead students to the conclusion that they are *negative* reciprocals to each other.

Work through example 3 TE pg. 313, additional examples, and example 4.

Summarizing Activity: **Make 6- section foldable. Cut and glue 6 sets of equation pairs on front folds. Inside sections will contain their graphs. Get six examples from TE pg. 314 # 32, 33, 36, 40, 38, 39.**

Homework: **Checkpoint Quiz 2 from Grab & Go File (Chapter 6).**

Algebra I Lesson Plans for Block Schedule

Day 25 and 26 *City Scene – (reviews graphing coordinate pairs and following directions!)*

<u>Essential Question:</u> How can I practice writing linear equations, in addition to writing parallel and perpendicular lines, to reinforce my proficiency? Can we please slow down and "smell the coffee"?

<u>Objective(s):</u> 4.01; 2.02

<u>"SAP":</u> Students will take the next 2 days to do the following Algebra Lab activity of creating a personal "graphing" book. Follow the directions below.

<u>Lesson Anatomy</u>: Warm-up and homework check. Share with the students that we're going to stop and reflect on all the linear graphing activities we've learned over the past few days.

The students will be working on a project called "Graphing and Growing". They will each produce a complete book with a cover and illustrations. Outline is as follows:

***<u>Materials Needed</u>*: 6 pieces of construction paper**
2 sets of graphs
markers
glue sticks
scissors
ruler
pencil and colored pencils

***<u>Procedure</u>:* Secure 6 pieces of construction paper and fold all of them as a "hamburger" (in half). Cut each paper in half. Put 2 hole-punches along the left side of each sheet. You are now ready to begin your book.**

Give your book a title.
Decorate the cover.
Put the authors name on the front cover and date it.

On page 1 - Title as: TABLE OF CONTENTS

On page 2 - Title as: GRAPH A LINE USING A POINT & SLOPE.

Example – (-3, 2) and a slope of $-\frac{4}{5}$. Once your point and Slope are chosen, graph the line on graph paper. Make it colorful, and glue graph on to construction paper. Write a statement connecting the equation and the graph.

On page 3 - Title as: GRAPH A VERTICAL LINE (ex. → $x = -3$)
Graph the information on graph paper and glue the graph to the construction paper. Write a statement to link the equation and graph.

On page 4 - Title as: GRAPH A HORIZONTAL LINE (ex. → $y = 8$) Repeat above procedure.

On page 5 - Title as: GRAPH THE 2 LINES AND FIND THE POINT OF INTERSECTION. (ex. → $x = -2$ and $y = 5$)
Graph the information, label the point of intersection, and glue onto construction paper.

On page 6 - Title as: GRAPH A LINE USING A TABLE
Construct a table with data for (ex.→ $y = x + 4$). Graph the Slope-intercept form of the equation. Glue the table AND the Graph beside each other and write a brief description.

On page 7 - Title as: GRAPH A LINE GIVEN AN "x" AND "y" INTERCEPT (ex. → x-intercept = 6; y-intercept = -4)
Write your two ordered pairs, graph the information, and glue on construction paper. Write summary sentence.

On page 8 - Title as: FIND THE X AND Y INTERCEPT, THEN GRAPH THE LINE (ex. → $-3x + 7y = 21$) Show the process of finding each intercept. Graph the equation and glue to construction paper. Write summary sentence.

On page 9 - Title as: GRAPH A LINE IN SLOPE-INTERCEPT FORM
(ex.→ $-8x + 2y = 12$) Put the equation in slope-intercept form. Write *m* = _____ and the "y" intercept: (___, ___) Fill in the Slope and y-intercept. Graph the equation and glue to construction paper. Write reflective sentence.

On page 10: Title as: ABOUT THE AUTHOR
You will write 5 sentences about you including:

- **your first, middle, and last name**
- **your age**
- **the name of your math class**
- **the name of your math teacher**
- **tell how you've enjoyed your math class this year**

As you finish your book, ask yourself:

- **have I numbered each page?**
- **check to be sure your name is on it**
- **have you reread your book to find spelling or**

	math mistakes? - **lastly, are your pages in order and have you joined them with colored yarn?**

<u>Summarizing Activity:</u> Sharing their completed books in small groups of 3-4. Students will answer 3 questions about their book. One – "was this an enjoyable experience and why?" Two – "what did you learn or have clarified that you were unsure of?" Three – did you have the knowledge and/or resources to be successful?"

<u>Homework:</u> None on these days.

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 27 *Warm-up "Odd-Numbered Magic Square"*

<u>Essential Question:</u> How do I write an equation for a *trend line* and use it to make

predictions? How do I write the equation for a line of *best fit* and use it to predict outcome?

Objective(s): 3.03 Create linear models for sets of data to solve problems. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.

"SAP": Collaborative pairs to complete Trend Line activity.

Lesson Anatomy: Praise students for the wonderful project books they created. Solve warm-up.

Review writing **and** graphing **of perpendicular/parallel lines. Together, as a class, review the steps by solving the following problems:**

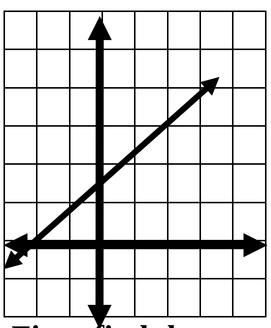
Write an equation for the line that is parallel to the given line and that passes through the given point.

(3, 4) y = 2x – 7 Ask, "for parallel lines, the slope has to be the same. So, the slope of the parallel line will be 2. Substitute in the point ordered pair and solve for the y-intercept.

$$(4) = 2(3) + b \quad \rightarrow \quad 4 = 6 + b \rightarrow \therefore \underline{b = -2}$$

So, the equation that passes through the point (3, 4) and is parallel to y = 2x – 7 is y = 2x - 2 !

What about the graph below?



First, find the equation of the line in slope-intercept form. The line crosses the *y-axis* at $\frac{3}{2}$ and the slope is $\frac{3}{4}$. Thus, the equation is $y = \frac{3}{4}x + \frac{3}{2}$. What would the equation of a line perpendicular to it, *write as* and *look like*, if it passed through the point (-3, 4). REMEMBER, the slope will be the negative reciprocal of the slope in the original equation. That would make the slope: $-\frac{4}{3}$. Substitute in the order pair

for “x” and “y”. $4 = -\frac{4}{3}(-3) + b \rightarrow 4 = \frac{12}{3} + b \rightarrow 4 = 4 + b \rightarrow b = 0$

Therefore, the perpendicular equation would be $y = -\frac{4}{3}x$.

(Repeat an additional example of each if necessary.)

Share with students that scatter plots are used to determine how to sets of data are related. At a glance, scatter plots can indicate a positive, negative, or no relationship between the data variables. Look at the table below.

Rise in Minimum Wage

YEAR	MINIMUM WAGE
1950	$. 75
1963	$1.25
1975	$2.10
1980	$3.10
1991	$4.25
1996	$4.75
1997	$5.15

Make a scatter plot to observe if a trend exists by graphing each ordered pair. For example, the first point would be (1950, $.75). Show students how to notate the graph, letting 0 correspond to 1950. Emphasize the need for equal increments along both axis. Once all the points have been plotted, use your eyes to predict if the data appears linear. Answer – yes, and since both data sets increase, the relationship is positive. Then, ask the students to take a piece of string and manipulate on the graph paper where the trend line best lies. Remind students that these lines are not precise but estimates, and that they should try to have about as many points above the line as below, and then lightly draw the line.

The next step would be to estimate two points on the line. For this data, it could be (30, 3) and (50, 5). Find the slope. $\frac{2}{20} = \frac{1}{10}$. Write the slope-intercept form of the trend line equation.

$$5 = \frac{1}{10}(50) + b \rightarrow 5 = 5 + b \;\therefore b = 0 \quad \therefore y = \frac{1}{10}x.$$

Ask students to predict what the minimum wage might be for 2003? Show how to plug into and manipulate the equation.

Put students into pairs. Pass out the table below.

Length and Wingspan of Hawks

Type of Hawk	**Length (inches)**	**Wingspan (inches)**
Cooper's	**21**	**36**
Crane	**21**	**41**
Gray	**18**	**38**
Harris's	**24**	**46**
Roadside	**16**	**31**
Broad-winged	**19**	**39**
Short-tailed	**17**	**35**
Swanson's	**19**	**46**

Collaborate to produce a scatter plot. Draw a trend line. Estimate two points on the line. Find the slope. Write the equation in slope-intercept form. Can you predict the wingspan of a bird whose length is 23 inches?

Summarizing Activity: Ask for volunteer pair to share their graphs and plots for students to cross-check with their work.

Homework: Re-teach 6-6 from Grab & Go file – exercises at bottom 1, 2, and 3.

2	4	6	10	12	14

8	16	18

Magic Square **– Cut out the numbers above. Order them from least to greatest. Which number is the** *middle* **number? Paste it to the middle box of the 3x3 square above. Paste the first number of the sequence (2) anywhere around the middle box. Place the last number of the sequence (18) at the opposite end of the 2. You should now have a 2, 10, and 18 to form a row, column, or diagonal. The sum of these 3 numbers is ____? Glue the remaining numbers into the empty spaces to add up to the same sum. (Hint: You may want to solve it before pasting the remaining numbers.) Put your name on the square and turn it in.**

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 28 *Warm-Up Math Smart – pg. 305 (A Puzzle of Numbers and Languages)*

<u>Essential Question:</u> How do I write an equation for a line of best fit and use it to make predictions?

<u>Objective(s):</u> 3.03 Create linear models for sets of data to solve problems. b) Check the model for "goodness-of-fit" and use the model, where appropriate, to draw conclusions or make predictions.

<u>"SAP":</u> Students will work in "triads" to complete Graphing "Line-of-Best-Fit" activity. Get students into groups by asking, "what movie would they like to see this weekend?"(Check local paper to get 6 choices) Establish groups.

<u>Lesson Anatomy</u>: Solve warm-up and check homework. Make transparency of the three homework scatter plots and work through examples together, recruiting student answers and reasons. Put the following table up on the overhead for one last homework example.

<u>"Speed on a Bicycle Trip"</u>

Miles	**5**	**10**	**14**	**18**	**22**
Time (min)	**27**	**46**	**71**	**78**	**107**

Draw a *trend line* **and write an equation. Use the equation to predict the time needed to travel 32 miles on the bicycle.**

Explain to the students that the trend line that shows the ***best*** **relationship between 2 sets of data is called a** *line-of-best-fit*. **Our graphing calculators compute the equation by a method called "linear regression". It also gives you something called a <u>correlation coefficient</u> (variable "r"), which tells you how closely the equation models the data. Draw the continuum line from TE pg. 319 and explain what the "r" value indicates. Proceed with <u>example 1.</u>**

Examine the following table:

<u>Recreation Expenditures</u>

<u>Year</u>	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
<u>Dollars</u> <u>(billions)</u>	**340**	**369**	**402**	**430**	**457**	**489**	**527**	**574**

We want to use the calculator to find the equation of the line-of-best-fit for the data and determine the *correlation coefficient*.
Pass out the Data Analysis Instruction Sheet for the TI-83.

Clear the calculator. Together, follow the steps. Use overhead calculator so students can see what the screen should look like with each step. Once the linear regression data is obtained, ask the students what form of equation does the information seem to show? Point out that variable "a" equates to "m" for the slope. Like in slope-intercept form, the "b" is the y-intercept, and the bottom "r" is the correlation coefficient. Remind students that the closer the "r" value is to 1, the stronger the linear relationship. The equation is: $y = 32.33x - 2671.67$

Put example 2 on the overhead.

U.S. Trash Production (millions of tons).

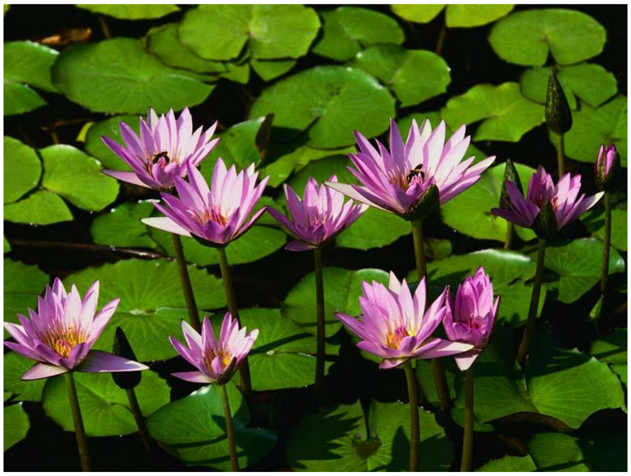
YEAR	TRASH
1960	88
1965	103
1970	122
1975	128
1980	152
1985	164
1990	196

Repeat above steps using TI-83 direction sheet. What is equation of the *best-fit* line? (*Remind students to ask what the best** window **values should be?)**

Get students into "triads" to complete "Graphing Line-of-Best-Fit" Activity.

Summarizing Activity: Ticket-Out-The-Door. – Answer, why do you think the Graphing Calculator is the *greatest* invention?

Homework: Bottom of Pr. 6-6 #8, 9, 10, and 11.



What's the "Best-Fit" Line? (Can you solve the "*equation*" mystery? *Private Investigators*: ___________________________

From the following tables of data, what is the equation for the line of "best-fit"?

Retail Department Store Sales (billions of dollars)

Year	1980	1985	1990	1994	1995	1996	1997	1998
Sales	86	126	166	217	231	245	261	279

Equation: ________________________________ Correlation Coefficient: _______

Average Male Lung Power

Respiration (breaths/min)	50	30	25	20	18	16	14
Heart Rate (beats/min)	200	150	140	130	120	110	100

Equation: ________________________________ Correlation Coefficient: _______

Wind Chill Temperatures for 15 mi/hr Wind

Air Temp	35	30	25	20	15	10	5	0
Wind Chill Temp!	16	9	2	-5	-11	-18	-25	-31

Equation: ________________________________ Correlation Coefficient: ______

<u>BONUS</u> – What's the mystery here?

<u>Math and Science Grades of Nine Randomly Selected Students</u>

Student	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Math	<u>76</u>	<u>89</u>	<u>84</u>	<u>79</u>	<u>94</u>	<u>71</u>	<u>79</u>	<u>91</u>	<u>84</u>
Science	<u>82</u>	<u>94</u>	<u>89</u>	<u>89</u>	<u>94</u>	<u>84</u>	<u>68</u>	<u>89</u>	<u>84</u>

Equation: ________________________________ Correlation Coefficient: _________

Explain the mystery, below.

____

____!

Algebra I Lesson Plans for Block Schedule

Day 29 *Warm-Up "Finding the Volume of Rectangular Prisms" pg. 201-* Math Smart

Essential Question: **How do we continue to analyze linear data using the TI-83?**

Objective(s): 3.03 Create linear models for sets of data to solve problem. b) Check the model for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions.

"SAP": Share *heart-rates* (beats per minute) – "Can't-You-Hear-My-Heart-Beat?" Lab Activity. Students will collect data on the number of times their hearts beat in a certain interval of time 15 seconds? 30 seconds? 45 seconds? 60 seconds? 75 seconds? 90 seconds? This data will be combined to create a class average on the number of heartbeats in the set intervals of time.
Students will graph the data and use algebraic skills to write the line of best-fit for their set of data. The results will be compared to the statistical best-fit linear function that the students find using their data analysis skills on their graphing calculator.

Lesson Anatomy: Check warm-up. Check homework. Examine the following table.

Country	Cigarette Consumption Per Adult/Per Year	Coronary Heart Disease Deaths Per 100,000 people
United States	3900	257
Canada	3350	212
New Zealand	3220	212
Great Britain	2790	194
Ireland	2770	187
W. Germany	1890	150
Netherlands	1810	125
Belgium	1700	118
Italy	1510	114
Sweden	1270	137

What is the independent variable for this data? ____________________________

Is this a function? Why or why not? _______________________________________

How would you describe the correlation? __________________________________

What is the correlation coefficient? ______________________

What is the equation-of-the-best-fit-line? ___________________________

Predict what the number of disease deaths per 100,000 people for adults smoking 3000 cigarettes per/year would be? ___________________________.

<u>"Can't-You-Hear-My-Heart-Beat?" Activity.</u>

Have students find their pulse and record the number of times their pulse beats for 15, 30, 45, 60, 75, and 90 seconds.

Form groups of 4 and have students find the average number of heartbeats for their group for each of the recorded time intervals. Record on the overhead, the average numbers for each of the groups. Have students look at the numbers given from each group and estimate the average number of heartbeats for the "class" for each 15-second increments. Assign each group at least one of the increments to calculate the exact average and compare to the class estimate. Record data to the nearest whole number of heartbeats.

Record the class average for each of the time increments and look for patterns in the "*domain*" and "*range*" variables. Is this a relation or a function?

Give large-block graph paper and a piece of string to each group of 4. Have students graph the data using a scale of <u>15</u> on the "x" axis and a scale of <u>5</u> on the "y" axis. Each group is to use the string to estimate where they think the "best-fit" line would fall. Students should record two points they think the line would pass through.

Each group should use the two points they chose and write the equation of their "best-fit" line.

Record the equations generated from each group and compare the results. They will have generated several different equations, but they will have very similar slopes and y-intercepts if they have been written correctly.

Plot the data points on the calculator and write the linear regression equation. Which of the groups' equations was the closest to the statistically calculated "best-fit" line?

Interpret the meaning of the slope and the y-intercept.

Grading Rubric!

Rubric	Excellent (3)	Acceptable (2)	Needs Work (2)
Graph	Graph drawn correctly; best-fit reflected correct reasoning; equation written correctly from two points.	Two of the 3 were well done, correctly.	One of the 3 was done correctly.
Data Analysis/ Calculator	Accurate use of calculator to create equation of best-fit; description of slope & y-intercept was accurate.	Two of the 3 were accurate.	One of the 3 was accurate.
Prediction Results How accurate?	Reasoning of prediction made sense; detailed explanation given; could explain how heartbeats could be used to measure time.	Two of the 3 were evidenced.	One of the 3 was evidenced.

<u>Summarizing Activity:</u> In their groups ask students to write down their prediction for the average number of heartbeats for the class if we had counted for 110 seconds and explain how they made their prediction.

<u>Homework:</u> "Cancer Deaths" (see attached)

Cancer Deaths

Name: ___________________ Date: ___________

The following data represents the number of cancer deaths per 100,000 people compared to the miles they live from the Columbia River in Washington State. A hydroelectric plant had been built by the river and industrial waste was being discarded into the river. The EPA required a massive cleanup of the river after this was discovered through a study of the large number of cancer deaths.

Miles to River	Cancer Deaths Per 100,000
9.5	147
9.4	130
8.6	130
10.7	114
10.4	138
8.2	162
0.4	208
5.6	178
3.7	210

a) **How would you describe the correlation?** ______________________________

b) **What is the correlation coefficient?** ___________________

c) **What is the equation of the best-fit line?** ________________________

d) **What would predict for the number of cancer deaths for people living at a radius of 7 miles from the river?** ______________________________

e) **What's your interpretation of the slope of the best-fit line?** ________ ____.

Algebra I Lesson Plans for Block Schedule

Day 30 *Warm-Up – Math Smart – pg. 200 " Finding The Area of Plane Figures."*

Essential Question: How do I translate the graph of an absolute value equation?

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems.

"SAP": Students will engage in *Carolina Four Corners* review activity to access prior knowledge.

Lesson Anatomy: Check homework and warm-up. Begin *Carolina Four Corners* **activity. Pass out a ruler and large index card. Have students print** *Carolina Four Corners* **at the top. Divide the card into four equal parts by making a "+". In the top left corner, have students draw a table of values (horizontal or vertical). For the "x" values, substitute your first initial, and for the "y" values, substitute your last initial.**
For the domain values of -2, 0, 2, and 4, decrease each value by 3 to obtain the range values. Insert into the table.

In the top right hand corner, ask the students to write the "generic" point-slope form of a linear equation. Then, ask them to find the slope of the line and record it as *m* = ___. Lastly, chose a point from their table and write the point-slope form of the equation.

In the lower left hand section, ask students to write the "generic" slope-intercept form of the equation. Then, re-write the point-slope form, using a different point from their table. Convert it into y = mx + b, and lastly, standard form.

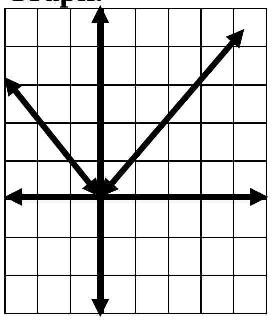
In the lower right hand section, graph the line.

From this activity, ask students to make a table of values for the following:

$y = |x|$

$\lvert x \rvert$	y
-3	3
-1	1
0	0
2	2
4	4

Graph.



Notice the "V" shape of the line – ask why? Repeat for y = │x│ + 3 and for y = │x│-2. Notice how the lines are "translated", reminding students that "b" is the y-intercept.

Lastly, have students graph y = │x + 1│. Then, ask them to predict what the graph of y = │x - 2│.

<u>Summarizing Activity:</u> Divide students into quads. Assign 1 member to graph y = │2x│. Member 2 will graph y = │2x│ + 3. Member 3 will graph y = │2(x – 1)│ and member 4 will complete y = │2(x-1)│ + 3. Glue on half a sheet of poster board. Display results on poster-board.

<u>Homework:</u> Form C Test – Alternative Assessment – Task 4 only.

Day 31 *Warm-Up – Puzzle- "What Did The Skunk Say When The Wind Changed?"*
(Pre-Algebra with Pizzaz)

<u>Essential Question:</u> How do I get ready to do well on my Chapter 6 Test – an "A".

<u>Objective(s):</u> All covered in the Chapter lessons: 3.03, 2.02, and 4.01.

<u>"SAP":</u> Students will work in triads to complete teacher-led chapter review. Students will then work with a partner to play equation MATHO Game. Each student will solve the problem and then confer with their partner as to the correct answer. When a winner(s) are declared, the teacher checks the card to determine if the five in a row have actually been called. When one student wins, their partner wins as well.

<u>Lesson Anatomy</u>: Check homework and turn in warm-up. The students will be involved in a class review of Chapter 6. Place students in groups of three. Pass out Chapter 6 Review to each member. Students may work together to solve problems and answer questions. The teacher will direct and guide the review pacing.

Solicit group members to solve problems on the overhead and whiteboard. Allow them to answer the "questions asked". Complete the review.

Next, put the students into pairs to play MATHO Game on solving equations. Award token prizes to winners. Partners are allowed to verify answers with each other. Play as time permits. Any row wins – diagonally, horizontally, and vertically.

<u>Summarizing Activity:</u> Ticket-Out-The-Door. Students will answer the question: "Are you ready to take your test? Yes or No? Why?

<u>Homework:</u> See attached Chapter 6 "Linear Lingo".

Chapter 6 Review-"Graphing"

Name: ________________________ Date: __________________

***Fill in the blanks with the correct vocabulary*.**

If a graph has shifted horizontally, vertically, or both, it has undergone a

______________________.

The ratio of the vertical change to the horizontal change is simply a description of

__________.

Two lines are ____________________ if the product of their slopes is -1.

Scatter plots illustrate how two sets of data are related. From them, you can draw

a ____________ ____________, but the *most* accurate picture is the "___________

of __________ _________". The "r" value from the calculator screen, which tells us

how closely the equation models the data, is called the _______________________

______________________.

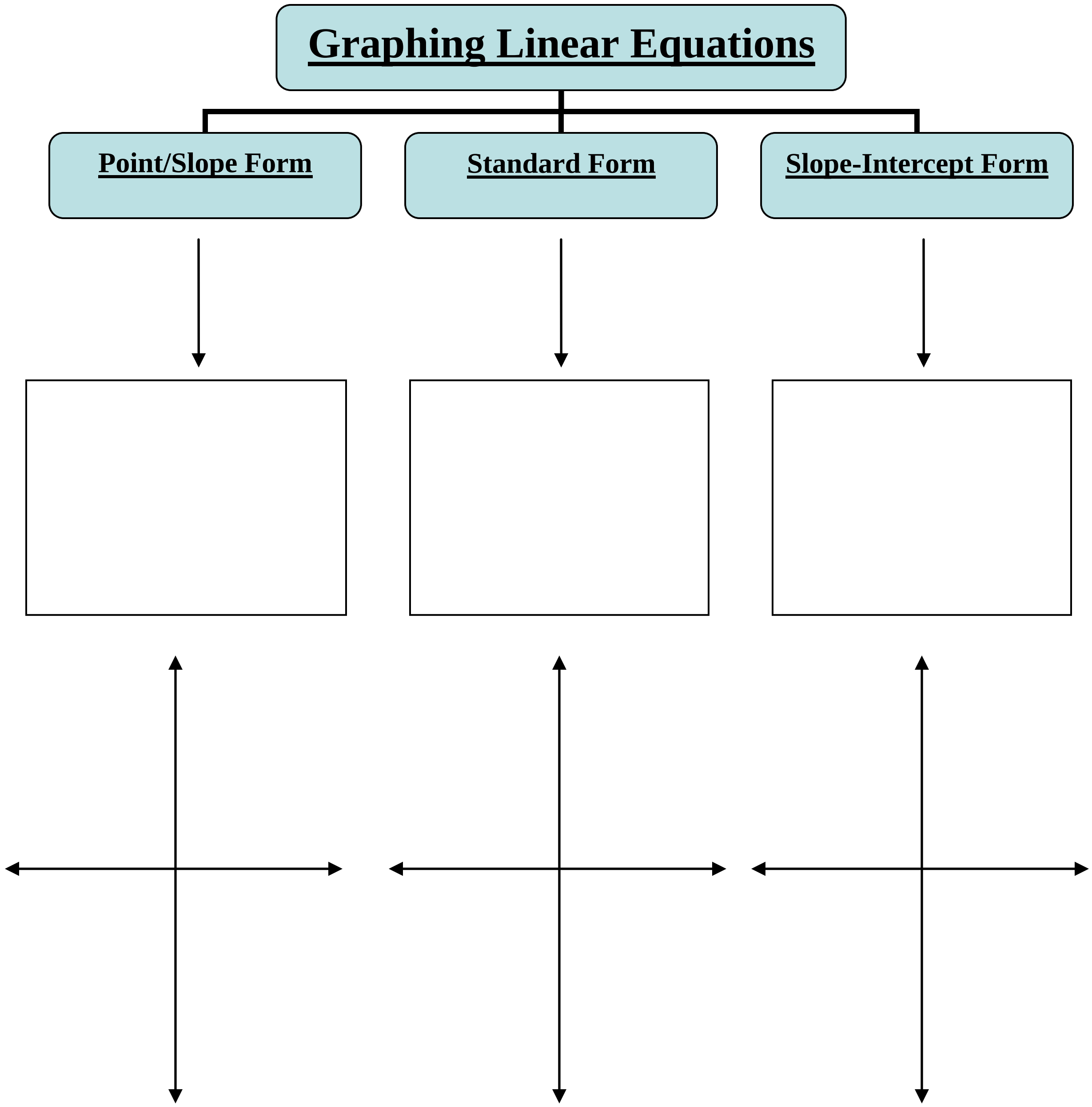
The "generic" form of a linear equation that tells us where the line intersects the

y-intercept is called __________-____________ form.

Find the *slope.*

(3, -2) and (-5, -4) ___________ (4.5, -1) and (4.5, 2.6) __________

Complete the following diagram.



Write an equation for each of the following conditions.

a) **parallel to: y = 5x – 2 and passes through (2, -1).**

b) **perpendicular to: y = -3x + 7 and passes through (3, 5)**

The *line of best fit* of a scatter plot is the most accurate trend line for the data. Find the equation of a line of best fit using a graphing calculator. The *correlation coefficient* tells how well the equation of the line of best fit models the data.

<u>U. S. Poultry Consumption in Pounds per Person</u>

Years	Pounds
1970	33.8
1975	32.9
1980	40.8
1985	45.5
1990	56.3
1995	62.9
2000	68.4

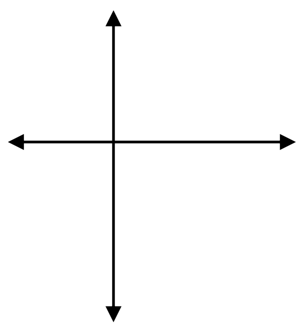
Find the equation for the line of best fit. ______________________________

Predict how much poultry the average person will eat by 2010. _______________

Fill in a table of values and graph the equation by "translating": **$y = |x|$**

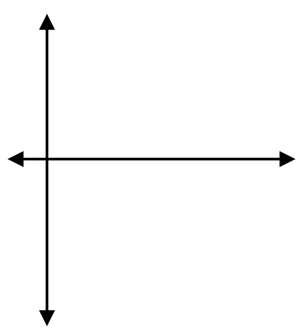
$y = |x - 2|$

X	Y



$y = |x| - 3$

X	Y



M	A	T	H	O

Fill in your card with a random assortment of numbers from 1 – 30. Do not repeat a number.
You will only use 25 out of the 30. You WILL need pencil and paper. Any row wins – horizontal, vertical, or diagonal.

1 $x = 1$	**7** $y = -2$	**13** $y = 4x + 9$	**19** $y = 2$	**25** $y = \frac{4}{5}x + 4$
2 $y = -4x + 3$	**8** $y = -\frac{6}{7}x - \frac{18}{7}$	**14** $y = 2x + 14$	**20** $x = 3$	**26** $y = \frac{1}{4}x - 2$
3 $y = -\frac{2}{7}x + 10$	**9** $y = -2x + 18$	**15** $x = 5$	**21** $y = 5x - 7$	**27** $y = 2x + 5$
4 $y = -x$	**10** $y = 5x + 18$	**16** $y = -\frac{3}{4}x + \frac{1}{4}$	**22** $y = 3$	**28** $y = \frac{1}{5}x - 1$
5 $y = \frac{2}{3}x - \frac{14}{3}$	**11** $y = \frac{5}{2}x + 5$	**17** $y = -2x - 11$	**23** $y = -3x + 16$	**29** $x = -6$
6 $y = \frac{3}{4}x + 1$	**12** $y = \frac{4}{3}x - \frac{1}{2}$	**18** $y = \frac{3}{2}x - 3$	**24** $y = -2x$	**30** $y = -\frac{1}{2}x + 6$

<u>MATHO GAME</u> – *Questions and Answers*

1.	**m = 5 (-2, 8)**	**Answer: 10**
2.	**m = -2 through origin**	**Answer: 24**
3.	**(2, -5) (0, 3)**	**Answer: 2**
4.	**(-3, -5) (-6, 1)**	**Answer: 17**
5.	**m =** $-\frac{1}{2}$ **(8, 2)**	**Answer: 30**
6.	**m = -2 (8, 2)**	**Answer: 9**
7.	**m = 2 (-3, -1)**	**Answer: 27**
8.	**m =** $-\frac{2}{7}$ **y-intercept of 10**	**Answer: 3**
9.	**11 to 4x – 3y = 6 (0,** $-\frac{1}{2}$**)**	**Answer: 12**
10.	**m is undefined (3, 2)**	**Answer: 20**
11.	**x-intercept of -5: y-intercept of 4**	**Answer: 25**
12.	**m = 0 (1, -2)**	**Answer: 7**
13.	**x-intercept of 8: y-intercept of -2**	**Answer: 26**
14.	**x-intercept of 5: y-intercept of -1**	**Answer: 28**
15.	**(-6, 2) (-5, 4)**	**Answer: 14**
16.	**x-intercept of 2: y-intercept of -3**	**Answer: 18**
17.	**vertical line through (5, 1)**	**Answer: 15**
18.	**(6, -2) (3, 7)**	**Answer: 23**
19.	**m =** $\frac{3}{4}$ **(4, 4)**	**Answer: 6**

20.	**m = 5 y-intercept of -7**	**Answer: 21**
21.	**(-3, 0) (4, -6)**	**Answer: 8**
22.	**m =** $\frac{2}{3}$ **(1, -4)**	**Answer: 5**
23.	**x-intercept of -2: y-intercept of 5**	**Answer: 11**
24.	**m = 0 (3, 2)**	**Answer: 19**
25.	**(-6, 1) (-6, 3)**	**Answer: 29**
26.	**m is undefined (1, 7)**	**Answer: 1**
27.	**(-1, 3) (3, 3)**	**Answer: 22**
28.	**m =** $-\frac{3}{4}$ **(-1, 1)**	**Answer: 16**
29.	**m = 4 (-2, 1)**	**Answer: 13**
30.	**m = -1 (0, 0)**	**Answer: 4**

"Linear-Lingo"

Name: ___________________________ Date: ________________

***Circle the correct answers to each question*.**

1. The "steepness" of a linear equation is called its

a) intercept b) slope c) formula d) run

2. Ax + By = C is what form of writing a linear equation?

a) point-slope b) intercept c) rise d) standard

3. The lines with equations y = -2x + 7 and y = -2x – 6 are

a) intersecting b) perpendicular c) vertical d) parallel

4. The equation $y = -\frac{1}{3}x + 2$ **is said to be in**

a) standard form b) point-slope form c) slope-intercept form

5. True or False? The slope of an equation is calculated by the run divided by the rise.

a) True b) False

6. What is the slope of the line passing through (2, -8) and (4, 1)?

a) $\frac{9}{2}$ **b)** $-\frac{6}{7}$ **c)** $\frac{7}{6}$ **d)** $-\frac{2}{9}$

7. What is the equation written in standard form of a line passing through (0, -3) and has a slope of $\frac{2}{5}$**?**

a) -5x + 2y = 15 b) -5x – 2y = -15 c) 2x – 5y = 15 d) -2x + 5y = 1

8. **Which equation has a slope of 0?**

a) $x = -2$ b) $y = -2$ c) $x = 0$

9. **A point-slope equation of a line is $y - 8 = -6(x - 3)$. It's slope is ______, and it passes through the ordered pair ________.**

10. **What is the x-intercept of the equation $9x - y = 18$?**

a) -2 b) 2 c) 9 d) 18

11. **The equations of the lines are $2x + y = 7$ and $8y = 9 + 4x$. They are**

a) Parallel b) Perpendicular Why? _______________________

12. **The equation of a line in standard form that passes through (-1, 7) and (-4, 9) is**

a) $2x + 3y = 19$ b) $-3x + 2y = 17$ c) $-2x + 3y = 23$

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 32 *<u>Math Smart</u> – pg. 257. Evaluating Functions. (Reviews substitutions)*

<u>Essential Question:</u> What's ahead and how will I do on my Chapter 6 test?

<u>Objective(s):</u> same as previous day.

<u>"SAP":</u> The students will complete a graphic organizer that defines, with examples, the meaning of "less than", "less than or equal to", "greater than", and "greater than or equal to". Verbal expressions are translated into *inequality* **expressions. The students will then solve several inequality expressions to show how *multiplying* and *dividing* by <u>negative</u> numbers requires the inequality sign to be <u>reversed</u>, and to show how inequalities have an** *infinite* **number of solutions.**

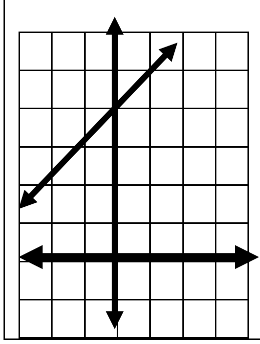
<u>Lesson Anatomy</u>: Check homework and warm-up. Introduce students to next chapter by talking about "inequalities". Discuss how students would solve:

c + 9 = 3; d – (-3) = 13; discuss how ONE answer is the solution. Lead discussion to the meaning of "inequalities"…what does that mean? Share that the solution will have an *infinite* **number of answers. Distribute graphic organizer to each student with attached examples.**

Define: <, >, ≤, ≥ What do they mean? Complete the table to define terms "verbally". Students will then work through introductory examples to learn rules of solving inequalities. Discuss how they are *similar* **and** *different* **to solving equations.**

Students will then take their Chapter 6 test. Good Luck!

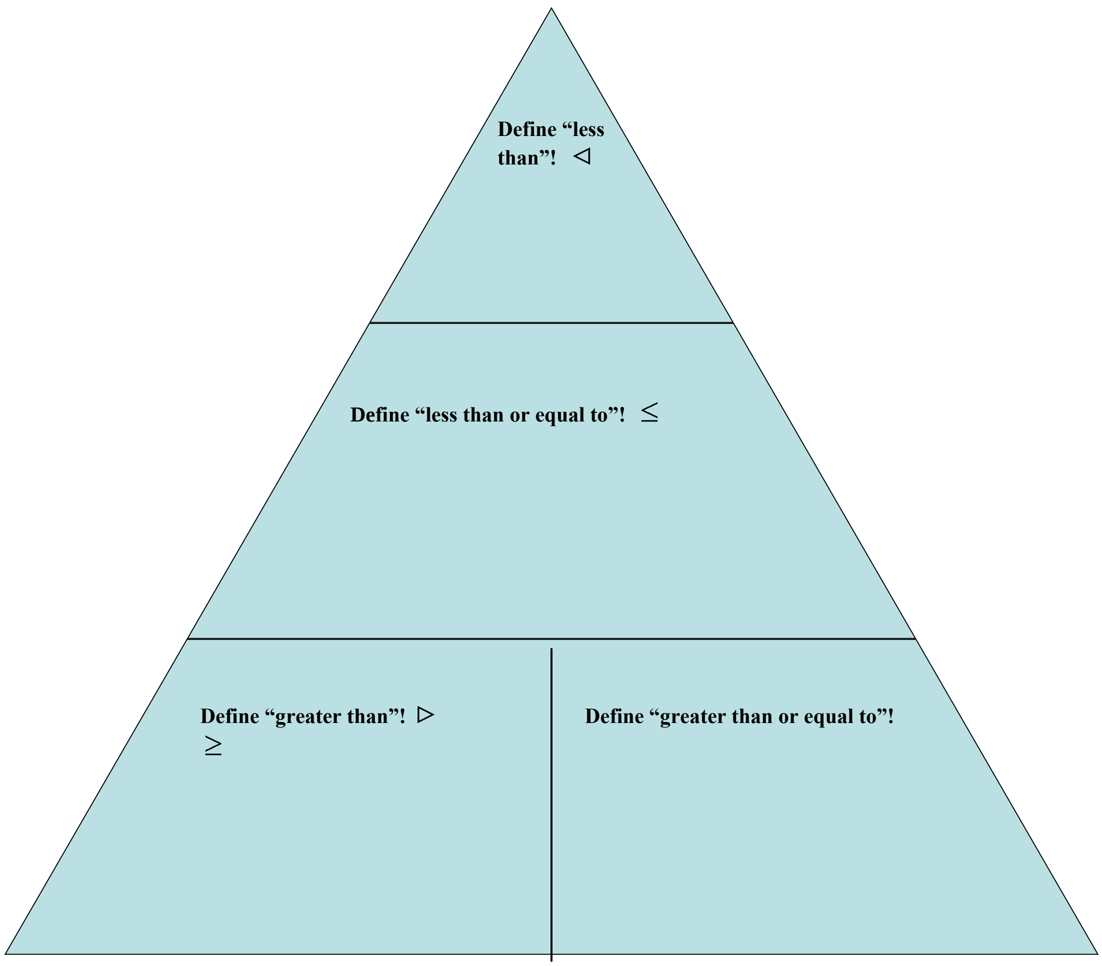
<u>Summarizing Activity:</u> Pass out large graph sheet to each student. Have students graph: y = x + 4, neatly and in color. File in notebooks until next day.



<u>Homework:</u> "Inequality-Solving" Practice

<u>*What are Inequalities*?</u>

Name: ____________________________ **Date:** ______________



Solve the following.

$c + 9 \le 3$

$d - (-3) < 13$

$-5 + 14b \le -4 + 15b$

$\mathbf{2x - 6.5 \geq 11.4 + x}$

$\mathbf{-25 >} \frac{a}{-6}$

$\mathbf{-}\frac{7}{9}\mathbf{x < 42}$

$\frac{4}{7}\mathbf{y \leq -}\frac{2}{5}$

$\mathbf{8c - (c - 5) > c + 17}$

$\mathbf{3(a +} \frac{2}{3}\mathbf{) \geq a - 1}$

Inequality Solving Practice

Name: ____________
Date: ________

Solve each inequality – watch your "signs"!

Work each problem in the "problem" box and follow the directional arrows to place the answer.

$x + 4y \le 8$ →	**Answer ↓** __________	**$y > -x + 2$ →**	**Answer ↓** __________	**$2x + 3y < -9$ ↓** ↓
Answer ↓	**← $y > 2x + 6$**	**Answer ↓**	**← $y \le \frac{3}{7}x + 2$**	**Answer ↓** __________
$4x + 2y < -8$ →	**Answer ↓** __________	**$y \le \frac{3}{4}x + 1$ →**	**Answer ↓** __________	**$x – y > 4$ ↓** ↓
Answer ← ↓ → __________	**$-5x + 4y <- 24$**	**Answer ↓** __________	**← $y \ge -\frac{2}{5}x - 2$**	**Answer ↓** __________

Algebra I Lesson Plans for Block Schedule

Day 33 *Warm-Up – Naming Polygons to Solve the Puzzle.*

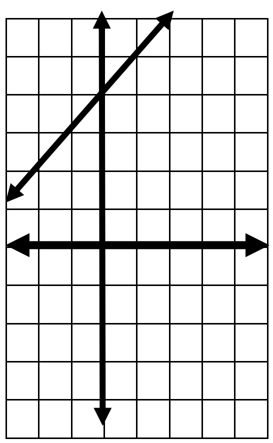
<u>Essential Question:</u> How do I graph linear inequalities and use them to model real-world situations?

<u>Objective(s):</u> 4.01 Use linear functions or inequalities to model and solve problems; justify results; a) solve using tables, graphs, and algebraic properties.

<u>"SAP":</u> Pass out two sheets of colored copy paper, ruler, and a colored pencil. Make a 4-page "hamburger" book. Staple seam to secure. Create title "Graphing Inequalities" on the front cover as well as student name. Use book to complete graphing of guided examples below.

<u>Lesson Anatomy</u>: Return tests. Take 5-10 minutes to discuss any questions and/or solve problems. Emphasize tutoring opportunities! Check homework and warm-up.

Students are to locate the graphs of: y = x + 4 from the previous day.



Make a table of values to determine if the line is correct.

x	y
-1	3
1	5
0	4
-2	2

The table shows the line is correctly drawn.

Ask, "what if the values were substituted into the inequality y > x + 4?" Are they true statements? If they are true, plot the points on the graph. What do you observe? None of the points make the inequality true!

Test three points *above* and *below* the graph.

Above	***Below***
(-1, 4)	**(0, 0)**
(0, 5)	**(1, 3)**
(-2, 3)	**(3, 2)**

Substitute each point into $y > x + 4$. Mark the points on the graph if the results are true statements. Lead discussion to the conclusion that you would choose the points above to "graph" the inequality. Remind students there are infinite answers. The decision is what side of the line those answers lie on. Also, share that because *none* **of the points from the table satisfy the inequality, the line needs to be *dashed* instead of solid. You would then shade above the dashed line to complete the graph to show that the solution is defined by a region on the coordinate plane, with the line, solid or dashed, acting as the boundary.**

Pass out sheet of graph paper with multiple graphs on it. Model several examples together asking students to predict whether the line should be solid or dashed, in addition to what boundary side would be shaded. Examples include:

$y > x + 1$ $\quad$ $y \leq -2x + 4$ $\quad$ $y < 2x + 3$ $\quad$ $3x - 5y \leq 10$ $\quad$ $6x + 8y \geq 12$

Remind students to solve the inequalities for "y".

Summarizing Activity: **Partner students and have them predict what the graph of: $y \geq x$ would look like. Make a table. Graph on the last page of the booklet and discuss results.**

Homework: **Pass out multiple graphs on single sheet of paper. Students will complete, from Grab and Go File, Pr. 7-5, # 20-30, evens only.**

Algebra I

Day 33a – *Warm-Up – 5 Questions – Solving Inequalities*

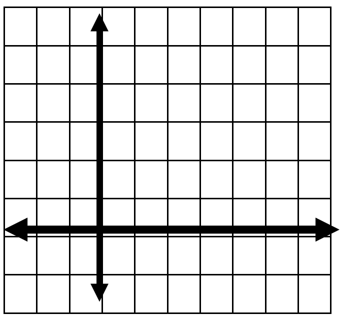
Essential Question: **How do I find solutions to inequalities and graph them on the**

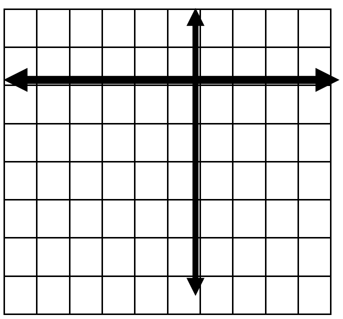
number line?

Objective(s): All covered in Chapter 2

"SAP": Partner to solve real-world application questions.

Lesson Anatomy: Graph: $y \le -3x$; $4x-4y \le 8$





Begin by asking students which inequality sign would make the statements true? Put questions 6 – 11 (Lesson Preview Pg 134) on overhead and ask students to predict which sign satisfies the examples – why? State that the "solution" to an inequality is any number that makes the statement TRUE.

Put example 2 (from T.E. pg 134) on the board and ask students to refresh their equation-solving process skills by telling how they would solve the inequality $2 - 5x > 13$.

Repeat for the following examples.

$6x - 3 > 10$

$4n - 3 \le 5$

$(4 - m)/m \ge 5$

$k/-16 + 45 < -36$

Pass out pre-made number line graphs. Show students how they would graph the above examples on a number line.

On the next 3 graphs, have students graph "Check Understanding" #3 pg.135 Lead into interpreting the graphs from example 4 (pg. 135) and Check Understanding #4, a. & b.

Pair students. Pass out "ticket" that asks them to answer and explain the following.

"*Explain the difference between the verbal expression, "4 greater than x" and "4 > x"*.

Suppose your school plans a musical. The director's goal is ticket sales of <u>at least</u> $4000. Adult tickets are $5.00 and student's tickets are $4.00. Let a represent the number of adult tickets and "s" represents the number of student tickets. Write an inequality that represents the director's goal. Solve the inequality and graph it.

Lead into examples from pg. 143. Have students create a "hot-dog" fold.
Divide the front into 6 sections. Have students copy the following examples on the front, 1 per box.
$3/5 + z \geq -2/5$

$7.5 + y < 13$

$(2/3) + t - (5/6) > 0$

$-27 \geq 3z$

$16 > 3.2h$

$(-3/4)q > 4$

On the inside, match up the boxes and solve each inequality and graph their solutions on the number line. On the back of the foldable, have students copy the four Lesson Quiz 3-3 problems. Solve and graph individually.

<u>Summarizing Activity:</u> Complete the back of the foldable and turn in for a grade.

<u>Homework:</u> Pg. 704 #2-16 Evens Only!

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 33b – *Warm-Up – Review putting equations in slope-intercept form.*

<u>Essential Question:</u> How do I solve and graph multi-step inequalities; variables on "one" and "both" sides?

Objective(s): 3.08 Use linear equations or inequalities to solve problems.

"SAP": Partner to complete "matching activity"

Lesson Anatomy: Check homework. Review by completing "Check Skills You'll Need (pg. 153).

Lead into modeling solutions to inequalities with variables on one side by demonstrating example 1, with additional practice from "check understanding" from the bottom of pg. 153. Continue to demonstrate solving inequalities with variables on *both sides* **by using examples 3, 4, and 5, including any additional examples pulled from each "check understanding". (Pg. 154-155) Have students choose 5 examples to graph.**

Pass out "matching activity" and allow students to work in pairs to solve.

On the back of the matching activity, have the students complete pg. 157 #54-59.

Check solutions to matching activity. Assign homework.

Summarizing Activity: Ticket-Out-The-Door – "Suppose a friend is having difficulties solving: 2.5(p – 4) > 3(p+ 2). Explain how you would solve the inequality.

Homework: Re-teach – 3-4.

Matching Activity

Name: ___________________

Date:_____________________

Solve the inequalities on the left and **match to the correct solutions on the right, by connecting the dots with a ruler.**

$x + 3 \leq -4$ •	**• $x<-1$**
$x - 2.5 > 0.5$ •	**• $x<-7$**
$x - 3 + 1 \geq 0$ •	**• $x< 8$**
$5-2x \leq 3-x$ •	**• $x \geq -23$**
$-(8 - x) < 0$ •	**• $x > 3$**
$4x + 5 < -4x - 3$ •	**• $x \leq -7$**
$2x - 3(x + 3) \leq 14$ •	**• $x \geq 2$**
$8x - 6 < 3x + 12$ •	**• $x \geq 2$**
$-(x + 4) - 2 > 7$ •	**• $x < 3\ 3/5$**

Algebra I Lesson Plans for Block Schedule

Day 33c *Warm-Up – Solve 2 "Literal Equations"*

Essential Question: **How do I solve and graph compound inequalities using "AND/OR"??**

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems.

<u>"SAP":</u> **Reading/writing application discussion question and partner work.**

<u>Lesson Anatomy</u>: Check Re-teach homework questions.

Introduce the vocabulary word – "compound". Ask students if they know what a *compound* fracture is? Lead student's thinking into breaking a bone in more than one place. A "compound" inequality is a sentence that contains more than one inequality sign and therefore, more than one inequality phrase.

Model example 2 from TE pg. 162. Solicit predictions as to what the 2 inequality sentences are that can be derived from the example.

$-4 < r - 5 \leq -1$

Identify the inequalities and solve both. The solutions are: $r > 1$, and $r \leq 4$. Pass out number line graphs. Have students graph each response separately, then, combine the answers on a 3rd graph. Highlight what an "AND" solution is – "intersection" (what values satisfy both.)

Repeat the process for "check understanding" #2 – a & b pg. 162.

Model an OR problem from example 4 and 5. Put "additional" examples from TE pg. 163 on overhead and solve together. Then, follow up with individual practice with questions taken from the "check understanding" 4 & 5, to ensure students comprehension.

From pg. 164, assign #6, 12, and 18, followed by #24 and 30. Check solutions after allotted time.

**Ask students to summarize by explaining the difference between the words AND and OR
as used in a compound inequality.**

Partner students to look at questions 51, 52, and 53 (pg. 165) to show real-world application (reading/writing connection).

Have students complete "Checkpoint Quiz 2" – pg. 166. Turn in for a grade.

<u>Summarizing Activity:</u> **Checkpoint Quiz 2**

<u>Homework:</u> **Pg. 166 # 61-69.**

Algebra I Lesson Plans for Block Schedule

Day 33d – *Review – Order of Operations – Substitution Property.*

Essential Question: **How do I solve absolute value equations and inequalities?**

Objective(s): 4.01 Use linear functions or inequalities to model and solve problems.

"SAP": **Partner Practice**

Lesson Anatomy: **Check homework.**

Review basic absolute value problems by asking students to solve the following:

$|15|$

$|18-12|$

$|-10+8|$

$-|12-(-12)|$

Ask students to recall that absolute value is simply the distance away from zero.

Solve the example from pg. 167 Objective 1; leading into example 1 with "check understanding" practice.

Demonstrate example 2 with "check understanding" that follows directly into example 3, which solves the absolute value inequality.

Have students solve additional examples 2 and 3 from TE pg. 168-169 with a partner.
Check answers.

Continue to work with your partner to solve pg. 170 - #37-51 (odds only)– solving and graphing. Check answers in the back of the book.

Pass out Reading and Math Literacy – pg. 12. Review Vocabulary. Prepare a mini-review that covers Lessons 33 – 37.

Summarizing Activity: **Begin teacher-prepared review**.

Homework: **Finish Review.**

Algebra I Lesson Plans for Block Schedule 03

Day 34 *Warm-Up – pg. 145-146. Geometry Crossword Puzzle (reviews geometry vocabulary)*

Essential Question: **How do I solve "***systems of equations***" by graphing and analyze** ***special*** **types of systems?**

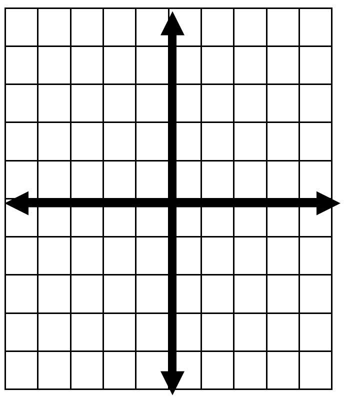
<u>Objective(s):</u> 4.03 Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.

<u>"SAP":</u> Students will participate in review "graphing" activity and complete *<u>Guided Instruction Packet</u>* on solving "systems" of equations by graphing.

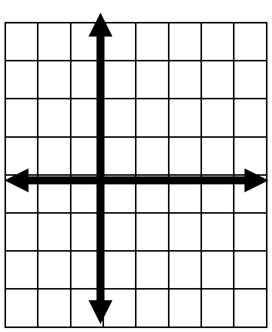
<u>Lesson Anatomy</u>: Check homework and warm-up. Review by asking students to solve the following:

Write each linear inequality in slope-intercept form. Then, <u>graph</u> the inequality.

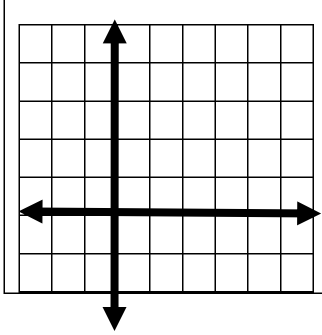
$2x - 3y \geq 7$



$5x - 3y \leq 6$



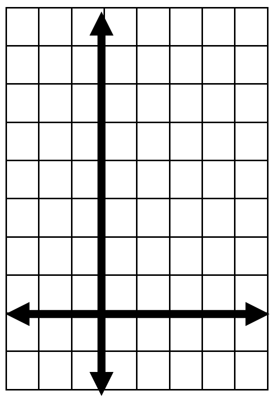
$4y + 6x > 8$



Suppose your class is raising money for the Red Cross. You make $5 on each basket of fruit and $3 on each box of cheese that you sell. How many items of *each* type must you sell to raise more than $150?

Let "y" represent the fruit basket, and "x" represent the cheese basket.

Write an inequality that describes the situation.
Graph the inequality.
What are two possible solutions to the problem? (points on the graph)



Clear up any difficulties from students' questions.

Introduce students to the day's lesson on solving "systems" of equations.
Partner students and pass out *Guided Instruction Packet* to each student. (See attached)

Guide student's learning through the packet, using the "Think-Aloud" format.
Allow students to keep packet until the next day to facilitate with homework.

Summarizing Activity: Have students stand and do a "Point-&-Go". Point and move toward a classmate. In 30 seconds, share one thing they learned about graphing "systems" of equations. Repeat two more times.

Homework: Textbook – pg. 344. #29-32. (Make sure students have graph paper.)

"SYSTEMS" OF EQUATIONS

SOLVE BY "GRAPHING"........

Name: ______________________ Date: ______________

<u>Essential Question</u>

How do I solve a "system" of equations by graphing, and how can I tell if the system has ONE solution, NO solution, or INFINITELY MANY solutions?

Think of the word "system"…skeletal system, digestive system…can you think of other systems? _______________________________________How do they work and what purpose do they serve? ____.

In algebra, if you have ___ equations and they both contain the ________ variables ("x" and "y", or "a" and "b", etc), together they are called a "______________". There are many ways to solve a system of equations, however, today we want to solve by _______________! (Look back at the EQ for a clue!)

Let's examine the *first* example.

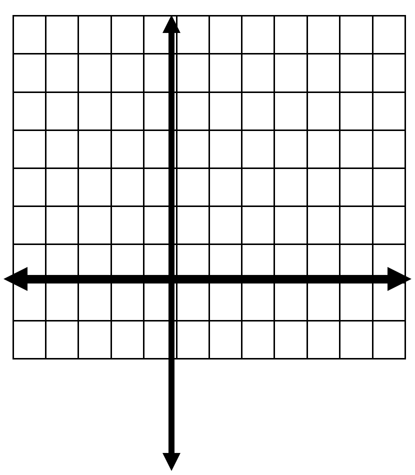
x + 2y = 1 AND 2x + y = 5

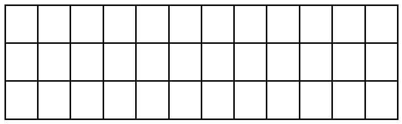
These two equations form a system because ________________________________.

Since we want to solve by graphing, it would make sense to first put each equation in what form? ______________________ The first one would look like:

y = and the second one would be y =

Good! Let's graph each one. Locate the y-intercept. Make a dot. Now, let's drive 1 down (why? _______________) and then drive right 2. Make a second dot. Connect the dots. For the second equation, the y-intercept is ____. Make a dot. Then, drive ______ two and right _______. Draw the line.





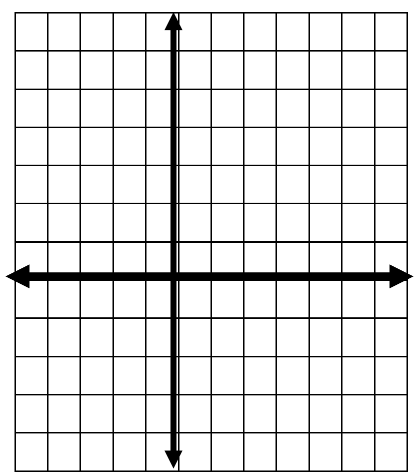
Okay…here's the crunch! Where the two lines int_______________, that *point* on the graph is the solution. What does the solution look like? An _______________ __________.

Therefore, this system of equations has _____ solution which is the ordered pair, (___, ____).

Let's try *example 2.*

1) x – y = 3 2) x – 2y = 3 In slope-intercept form, they are:

Let's graph them.

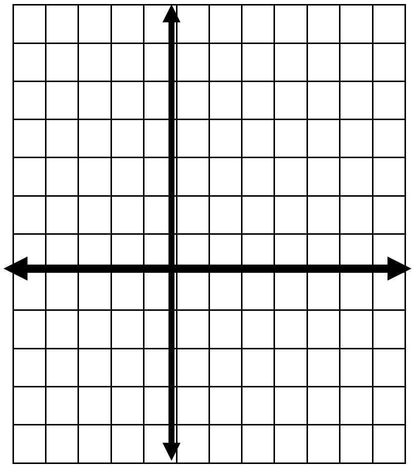


Do they intersect? _____ How many times? ___ So there is ______ solution to this system of equations and it is the ordered pair (____, ____).

OK…now you are experts at this, so try *example 3 on your own,* but you can talk with your partner if you need to.

1) x + 2y = 3 2) 3x – y = 0 In slope-intercept form they are:

Graph them.

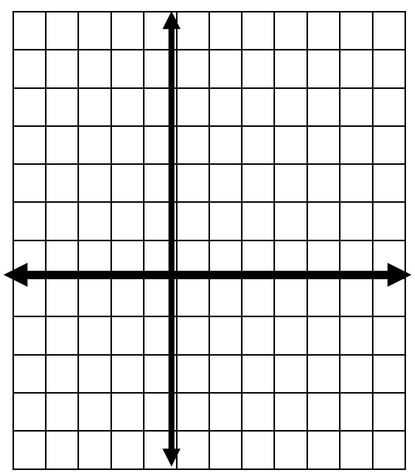


Your solution is _____________. YEAH!!! Good for you!

This time you are really going to be surprised! WATCH.

1) x + y = -3 2) x + y = 3 In slope-intercept form they are:

Graph them.

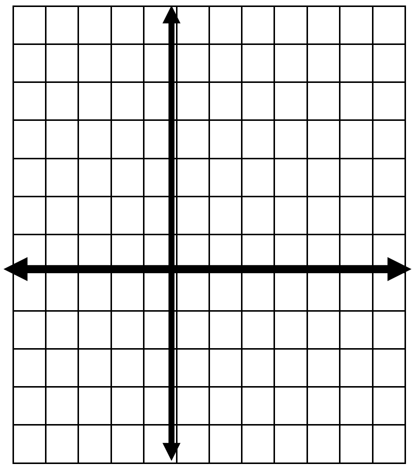


Oh, my gosh-golly! Can you believe this? Do these lines intersect? Will they ever meet? ____ Well, if this "system" never touches, then they have NO common point (ordered pair). What does that tell us about the solution? _____________________ WOW!

What about this *unique* example?

1) 3x – y = 2 2) 12x – 4y = 8 In slope-intercept form they are:

Graph them.



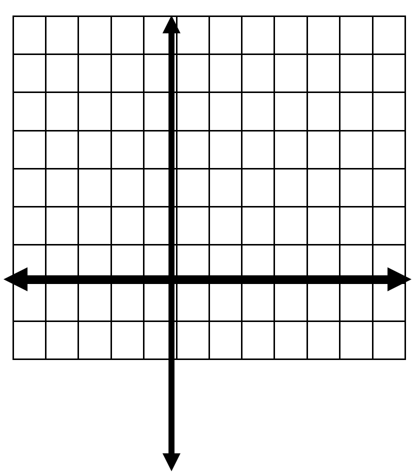
On my…the lines are ____________________. One is _________________ of the other. So what does that tell us about the ordered pairs, both equations have in common? ______________________________________. So, this *system of equations* must have ___________________________ solutions. Is that possible? _____

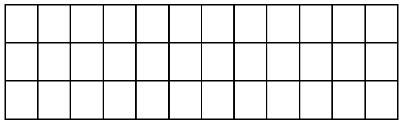
Now that you are all *experts* at solving systems by graphing, graph the following for "*<u>yours truly</u>*" ME!

Graph carefully!

1) $x - y = 3$ 2) $2x - 2y = 6$ In slope-intercept form they are:

Graph the lines.

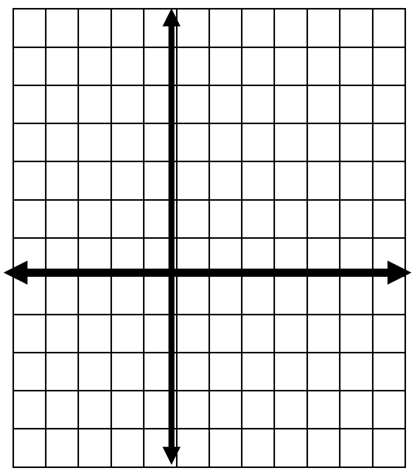




Solution: ________________

1) **x – 2y = 4** **2)** **-2y + x = -2** **In slope-intercept form they are:**

Graph the lines.



Solution: _________________

Algebra I Lesson Plans for Block Schedule

Day 35 - ***Math Smart – pg. 21- Using the Order of Operations for Form Calculator Words.***

Essential Question: **How do I solve "systems" of equations by substitution and apply to real-world problem situations?**

Objective(s): 4.03 Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.

"SAP": Students will model solving problems on systems of equations by *substitution* using a colored sheet of construction paper divided into 6 sections. Three examples will be modeling followed by 3 similar practice examples. Students will use this to complete the "summarizing activity**" and homework.**

Lesson Anatomy: Check warm-up and homework. Review Activity.

Divide the students into 6 groups. At 6 different locations in the room, have laminated poster-board graphs on the walls or whiteboard. Assign a group to each location. Each group member will have a role – recorder, timer/materials person, graph person, facilitator, problem leader, and a reporter. Using a yardstick, colored "Vis-à-vis", and the chalk board and/or whiteboard, have each group solve the following *system of equations* questions. Allow each group to record the problem, then, when the teacher calls "begin", the timer will count the time taken by their group to complete the problem, and then, tell the recorder to write it down. A group is finished when the graph is drawn and the solution recorded. Encourage students not to look at the other group's graphs. When the last group is done, the teacher will say "stop".

Students may then look around the room to see what the other graphs look like.

The questions are:

#1. $y = 3x - 4$ **and** $y = -3x - 4$
#2. $y = -x + 8$ **and** $y = 4x - 7$
#3. $x + 2y = 5$ **and** $2x + 4y = 2$
#4. $y = -6$ **and** $4x + y = 2$
#5. $2x + 3y = 4$ **and** $-4x - 6y = -8$
#6. $2x + y = -4$ **and** $5x + 3y = -6$

Have the reporter from each group be responsible for explaining the group's results. Clarify and answer questions as needed.

Have students divide a sheet of construction paper into sixths. Explain that another method for solving *systems of equations* is by the *substitution* method. By replacing one variable with an "equivalent" expression containing the other variable, you can create a one-variable equation that can be solved by using the substitution property.

For example: if you have two equations $y = -4x + 8$ **and** $y = x + 7$**, then you can create the equation** $(x + 7) = -4x + 8$ **and solve for "x". Once the value of "x" is**

determined, it can be substituted into *either* equation to solve for "y". In this example: 5x = 1, therefore "x" = $\frac{1}{5}$ (0.2). When substituted in the equation y = x + 7; y = 0.2 + 7 = 7.2. So, the ordered pair that solves the system is (.2, 7.2)!

Repeat for the example: y = 2x and 7x – y = 15. The equation becomes 7x – (2x) = 15: 5x = 15, so "x" = 3. Substitute in 7(3) – y = 15: -y = -6 $\therefore$ y = 6.

So, the solution to the system of equations is the ordered pair (3, 6)!!

Work through example 2 and 3, including the "Check Understanding" questions. This will complete the 6-sectioned construction sheet.

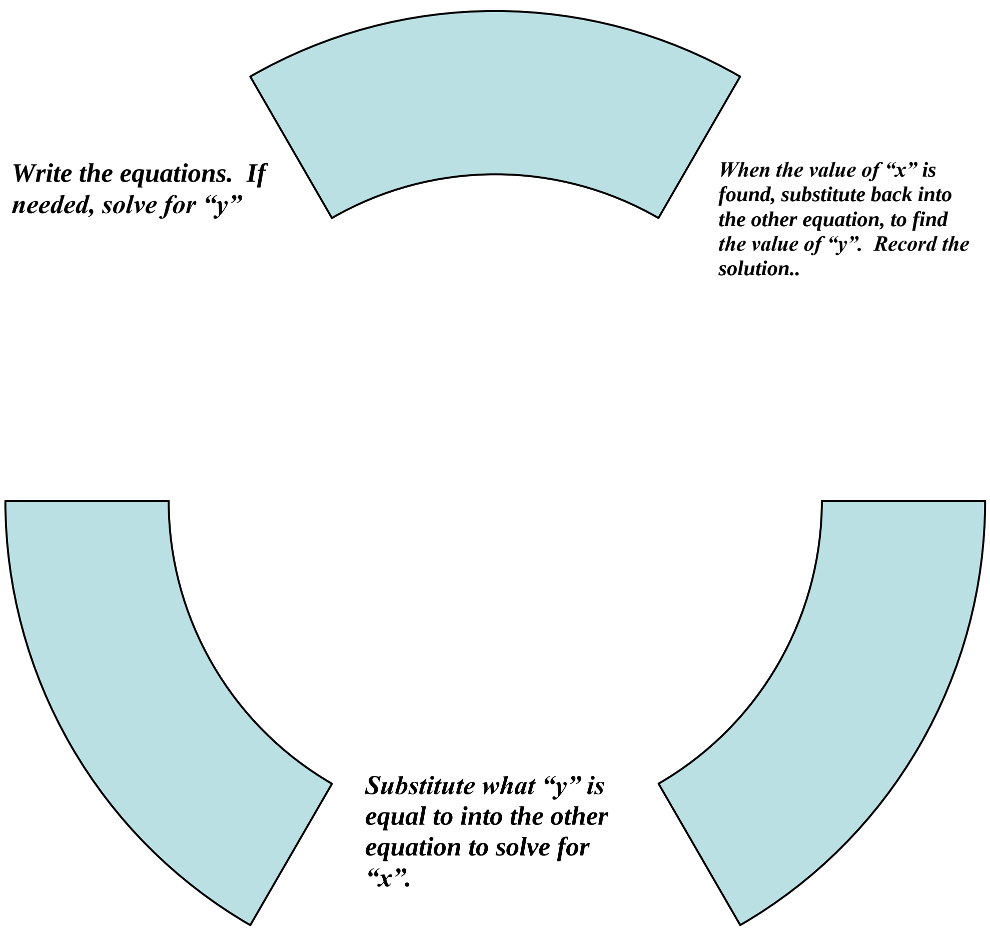
Summarizing Activity: Students will use the attached "graphic organizer" to solve problems from the textbook – pg. 350 #5, 7, 9, 10, and 14.

Homework: Students will use *graphing* each system to *estimate* the solution, then, use *substitution* to solve. Grab & Go File – pg. 9 (Re-teach 7-2; #1, 5, and 9.) Ensure students have graph paper.

Systems of Equations

"Solving by Substitution"

Name: ________________



Algebra I Lesson Plans for Block Schedule

Day 36 *Warm-Up – Algebra With Pizzaz – pg. 161. Reviews "systems" to solve puzzle.*

<u>Essential Question:</u> How do I solve a system of equations by "*elimination*" (using adding or subtracting).

<u>Objective(s):</u> 4.03 Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.

<u>"SAP":</u> Note-taking examples; Act-it-Out "Taco Bell Lunch".

<u>Lesson Anatomy</u>: Check warm-up and homework. The homework will serve as a review of previous *systems of equations* **study. Clear up any questions. The students will then take "<u>Checkpoint Quiz 1</u>" – TE pg. 352. Allow 45 – 50 minutes to complete, individually.**

Share with students that there is one last method for solving *systems of equations* and that is by a process called "elimination**". Explain that because of the** *addition and subtraction properties of equality,* **we can add or subtract equations to eliminate a variable. Have students copy the following example in their notebooks.**

Example 1

$5x - 6y = -32$
$3x + 6y = 48$ **Emphasize to students that this method works best when the equations are written directly BELOW each other.**

Demonstrate:

$$\begin{array}{l} 5x - 6y = -32 \\ \underline{3x + 6y = 48} \\ 8x + 0 = 16 \end{array}$$

Eliminate "y" because the sum of the coefficients=0
Divide by 8 to solve for "x"

$$\therefore \quad x = 2$$

You can then solve for the "eliminated" variable "y" by plugging in the "x" value into *either* equation. Choose one.

$$\begin{aligned} 3(2) + 6y &= 48 \\ 6 + 6y &= 48 \\ 6y &= 42 \\ y &= 7 \end{aligned}$$

The solution is (2, 7)!

Repeat procedure for: **a)** $\begin{array}{l} 6x - 3y = 3 \\ -6x + 5y = 3 \end{array}$ **b)** $\begin{array}{l} 2x + 3y = 11 \\ -2x + 9y = 1 \end{array}$

Next, work through "Real-World" example 2.

Explain that in these examples, to eliminate a variable, its *coefficients* must have a sum or difference of 0. But share with students, that sometimes you have to *multiply* ONE or BOTH equations by a non-zero number to make that happen.

Example 1

$$2x + 5y = -22$$
$$10x + 3y = 22$$

No coefficients add up to 0!

What would happen if we multiplied the first equation by (-5)? Why (-5)?

The result would be $-10x - 25y = 110$ **The second equation has 10x so no need to multiply it.**

$$\begin{array}{r} -10x - 25y = 110 \\ \underline{10x + 3y = 22} \\ 0 - 22y = 132 \end{array}$$

Divide both sides by -22, $\underline{y = -6}$!

Plug y = -6 into either equation.

$$10x + 3(-6) = 22$$
$$10x - 18 = 22$$
$$10x = 40$$

Divide both sides by 10, $\underline{x = 4}$!

So, the solution is (4, -6).

Repeat for example: **a)** $-2x + 15y = -32$, $7x - 5y = 17$ **b)** $3x + 6y = -6$, $-5x - 2y = -14$

Lastly, work through an example where *both* equations need to be multiplied.

Solve by elimination.

$4x + 2y = 14 \rightarrow$ ***Multiply by 3.***

$7x - 3y = -8 \rightarrow$ ***Multiply by 2.***

$$\begin{array}{r} 12x + 6y = 42 \\ \underline{14x - 6y = -16} \\ 26x + 0 = 26 \\ 26x = 26 \end{array}$$

Divide by 26; x = 1! Plug in into either equation. $4(1) + 2y = 14$

$$4 + 2y = 14$$
$$2y = 10$$

Divide both sides by 2; y = 5!

The solution is (1, 5).

Repeat for:

$$15x + 3y = 9$$
$$10x + 7y = -4$$

Summarizing Activity: **Partner students to solve pg. 57 - #16. Engage one pair of students in an "Act-it-Out" strategy by having them pretend they are heading out to Taco Bell for lunch. Students will work together to come up with the 2 equations and the solution to the system.**

<u>Homework:</u> Textbook – pg. 357 #24, 25, 26, and 28.

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 37 *Warm-Up – Proportion Practice – "What Do You Have When a Teacher Tells Two Students to Stop Talking and Do Their work?*

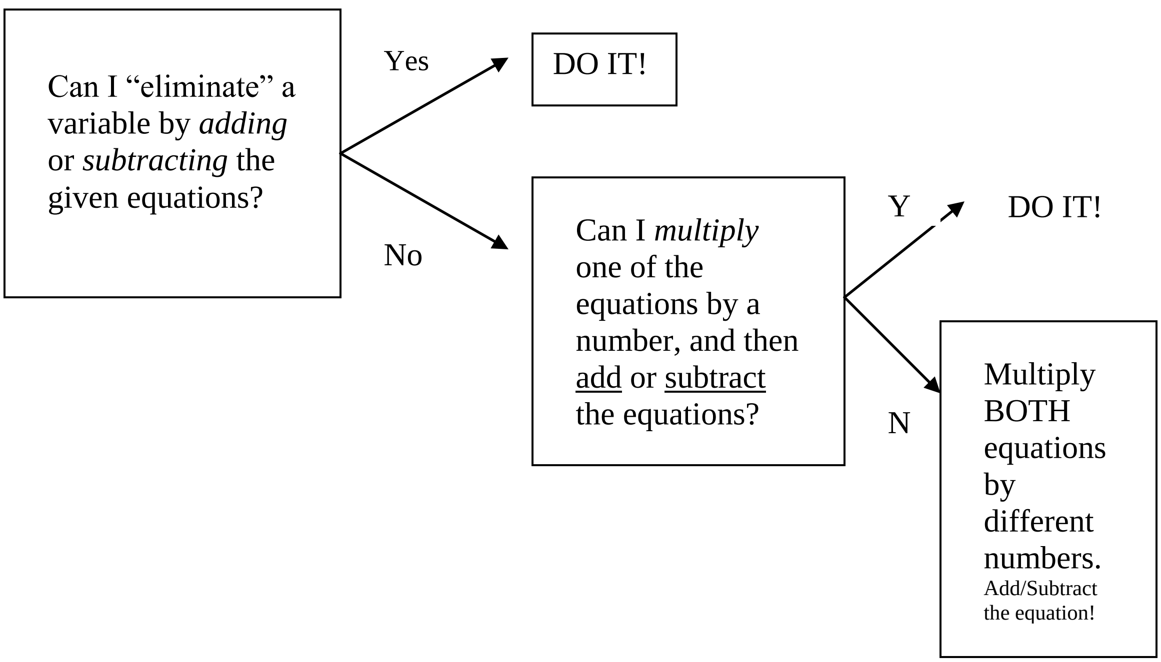
<u>Essential Question:</u> How do I write a "system of equations" from a real-world problem situation?

<u>Objective(s):</u> 4.03 Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.

<u>"SAP":</u> Students will work in pairs and triads to solve real-world problems by writing "*systems of equations*". Graphic Organizer and tables will be provided.

<u>Lesson Anatomy</u>: Check homework and warm-up. Pass back Checkpoint Quiz 1. Answer questions for clarification. For a review of solving systems by "elimination", pass out the following "flowchart".

<u>Strategies for Solving Systems – Have a Plan</u>



Work through one more *<u>word</u>* problem.

Page High School sold 456 tickets for a high school play. An adult ticket costs $3.50. A student ticket cost $1.00. Total ticket sales equaled $1131. Let "a" equal the number of adult tickets, and let "s" equal the number of student tickets sold.

a) **Write a system of equations that relates the number of adult and student tickets sold to the total number of tickets sold and to the total ticket sales.**

b) **Solve by elimination to find the number of each type of ticket sold.**

a) <u>a + s = 456</u> AND <u>3.5a + s = 1131</u> → Solve the system by "subtracting" "s".

Answer: 270 adults and 186 students.

If additional word problem example needed, use TE pg. 358, #29.

Direct the lesson, from this point, to going one step further, exposing students to the <u>writing</u> of "*systems of linear equations*" from verbal scenarios.

Devise an "organizer" to summarize the methods for solving systems of linear equations. See TE pg. 362 – Key Concepts.

Assign students into triads. Have each student complete a 3/fold, single sheet, "hamburger" brochure. Work through example 1 - pg. 362, and additional example 1 (TE pg. 363).

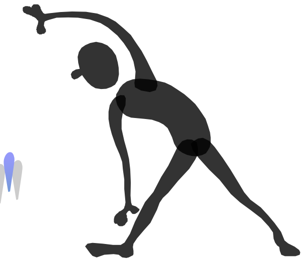
Complete example 2. Have students collaborate with group members to complete problems 2 and 3 from pg. 365. Provide groups with a table template for question 3. See below.

	Fruit Drink A 4% Sugar	Fruit Drink B 8% Sugar	Mixed Fruit Drink 5% Sugar
Fruit Drink (kg)			
Sugar (kg)			

<u>Summarizing Activity:</u> Partner students. Complete "Antifreeze Antics" – see attached.

<u>Homework:</u> Re-teach 7-4 (Grab & Go file)

"Antifreeze Antics"



Partners: ______________________________ ***Date:*** ____________________

One *antifreeze* solution is 10% alcohol. Another *antifreeze* solution is 18% alcohol. How many liters of each *antifreeze* solution should be combined to create twenty liters of *antifreeze* solution that is 15% alcohol?

	Antifreeze Solution – 10%	**Antifreeze Solution – 18%**	**Antifreeze Mixture – 15%**
Liters (L)			
Alcohol (%)			

Show your work, here!

____

____

____

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____

And your answer is _______________________ and ___________________________.

Algebra I Lesson Plans for Block Schedule

Day 38 *Warm-Up- "What is the Proper Thing to Say When You Introduce a Hamburger? Algebra With Pizzaz- pg. 197. (Reviews graphing Inequalities)*

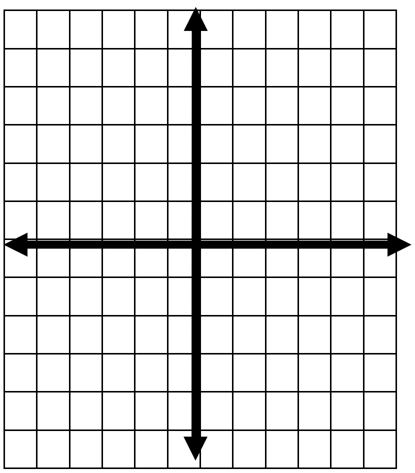
Essential Question: **How do I solve "*systems*" of linear** *inequalities* **and model real-world application situations?**

Objective(s): 4.03 Use systems of linear equations or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.

“SAP”: Students will complete It’s a Dog’s World problem. For a summarizer, students will be in groups of 4 to solve “What Geometric Figure am I?”

Lesson Anatomy: Check warm-up and homework. Begin lesson by doing “Skill Check” TE pg. 377, # 4, 5, and 6. This reviews graphing inequalities – remind students that inequalities can also be graphed on a number line.

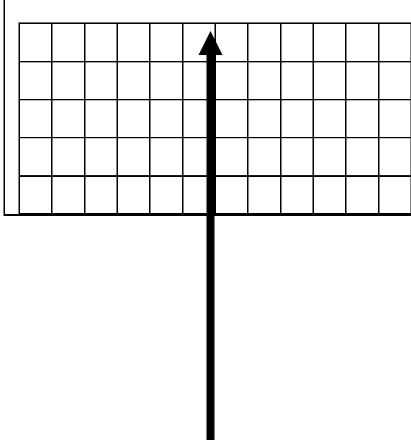
$y > 5$ $\quad$ $y \le \frac{2}{3}x - 1$ $\quad$ $4x - 8y \ge 4$

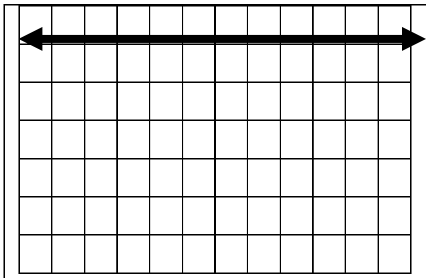


Remind students that when graphing an equality, ask yourself, “dashed or solid” and “which side to I shade?”

Lead to a discussion that like graphing “systems” of equations, “*systems of inequalities”* requires two or more inequalities. Ask students to predict “how” to arrive at the solution since shading is involved and not just an ordered pair.

Demonstrate example 1 below. $x \ge 3$ **and** $y < -2$





Graph and shade each inequality. Remind students that the shaded "*quadrant(s)*" area they <u>share</u> is the solution "area" to the system. A solution of a system of linear inequalities makes each inequality in the system, TRUE.

Reinforce by completing example 2. Graph the system of

$y < -x + 3$ and $-2x + 4y \geq 0$

followed by…

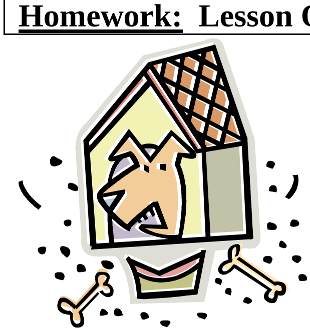
$y > 2x - 5$ and $3x + 4y < 12$

Pass out colored sheet of graph paper to each student and two colored pencils. Work through example 2 – (bottom of TE pg. 378). Actually graph top of TE pg. 379, giving students an opportunity to shade and graph each inequality, before coming up with the "system of inequalities" from a *graph.*

Finish lesson with It's A Dog's World! (see attached)

<u>Summarizing Activity:</u> What Geometric Figure Am I? Divide class into quadrants- I, II, III, and IV. Assign each group from TE pg. 382, #31, #32, #33, and #34. Have each group report like the game "Whose Line Is It Anyway?" Class is to guess the geometric shape produced from each "system of inequalities". Award a prize to the group(s) who solves the most correct.

<u>Homework:</u> Lesson Quiz 7-6! (See TE pg. 383)



It's a Dog's World…

Partners: _______________________ Date: ___________

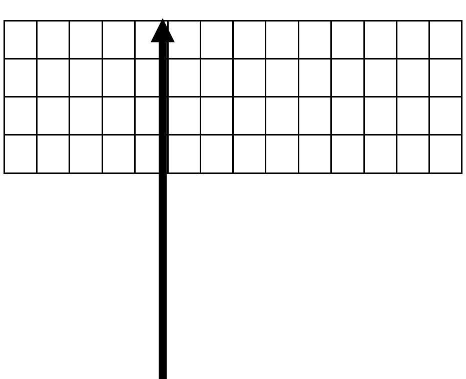
I'll help you get started…draw a "rectangular prism". On top, draw a "triangular prism". Watch me.

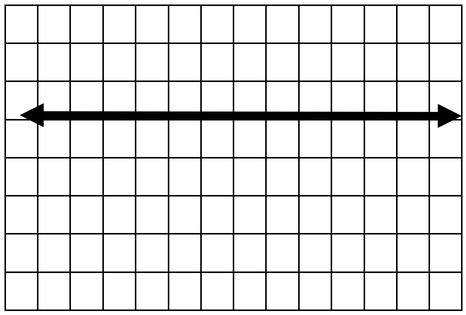
Here is the story…you know how dogs love to run and play. You work hard every day and you want to provide your dog, _____________, with a safe place to be until you get home.

Suppose you want to fence in a "rectangular" area for your dog. Your house will be used as one of the 4 sides. Since the house is 40 feet wide, the length "*l*" needs to be *no more than* **40 feet. You plan to use at least 150 feet of chain-link fencing. Write and graph the following system to find possible dimensions for the rectangle.**

Draw Here

Graph!





Don't forget the *dog house!*

Algebra I Lesson Plans for Block Schedule

Day 39 *Warm-Up – Review Quiz #1(see attached)*

Essential Question: How can I prepare to do well on my Chapter 7 test?

Objective(s): 4.03, 4.01

<u>"SAP":</u> The students will work with a partner to participate in the *<u>Chapter Scavenger Hunt.</u>* Prizes will be awarded.

<u>Lesson Anatomy</u>: Check homework. Work through the following real-world problem example with students:

Suppose you need $2.40 in postage to mail a package to a friend. You have 9 stamps, some 20 cents and some 34 cents. How many of each do you need to mail the package? *Write the system of inequalities and solve.*

Let "a" = the number of 20 cent stamps, and let "b" = the number of 34 cent stamps.

1) $a + b \leq 9$ 2) $20a + 34b \geq 240$

Pass out Quadrant I graph paper and demonstrate with the class.

Divide students into pairs. Pass each member a copy of *<u>Chapter Scavenger Hunt".</u>*

For each review question, the students are required to find the lesson in the chapter it came from (ie:7-3), what the *"essential question"* **was for that day, and solve the last question of "Exercises – Practice and Problem Solving", <u>example 1</u> section, ONLY, then lastly, answer the original question.**

Example: Suppose you have 12 coins that total 32 cents. Some of the coins are nickels and the rest are pennies. How many of each coin do you have?

<u>Section Lesson:</u> 7-4

<u>Essential Question:</u> How do I write *systems* of linear equations?

<u>Textbook Problem</u>: Pg. 365 #4 – Solve that problem. (Solve together as a class).

<u>Original Question:</u> Solve the "above" question.

Let 'x" = the number of nickels and "y" = the number of pennies.

1) $x + y = 12$ 2) $5x + y = 32$

Solve the system. *Answer*: <u>5 nickels and 7 pennies.</u>

Time the event and award 1st, 2nd, and 3rd prize.

<u>Summarizing Activity:</u> Ticket-Out-The-Door…What was today's lesson purpose? Was it helpful? Did you and your partner work well together? Why?

<u>Homework:</u> Textbook – pg. 708. #2, #4, #14, #23, and #28.

Review Quiz #1

Name: ______________

Date: ______________

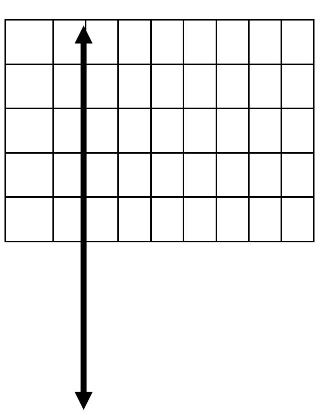
Solve each problem. Remember to put a box around your final answer.

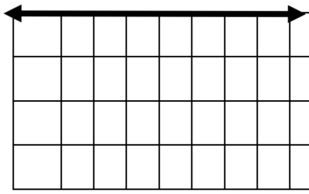
1. **Solve:** $4x - (2x - 3) + 7 = 3(2x - 4) - 2$

2. **If** $f(x) = 2x^2 - 3x$**, find** $f(-2)$

3. **What is the x-intercept of the graph of the equation** $2x - 3y = 12$**?**

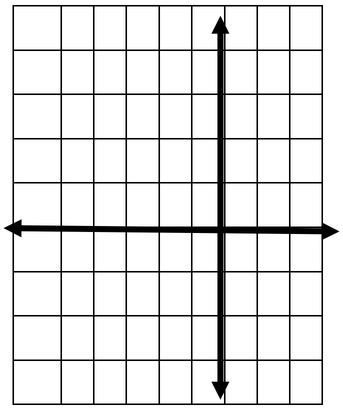
4. **Graph:** $2x - y = 3$



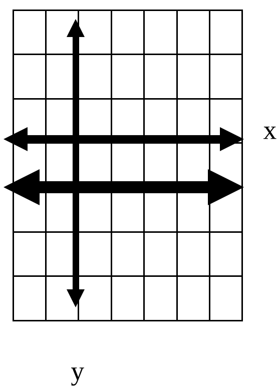


5. **Is (2, -1) a solution of the equation 3x – y = 7?**

6. **Graph x = -1**



7. **What is the equation of the following line?**



8. **What is the equation of the line through (-2, 3) and (4, -3)?**

9. **What property is illustrated by: 2x + (a + b) = 2x + (b + a)?**

____

10. **Is** $(-3,1),(4,-2),(8,-2),(9,3)$ **a** ***function? Show me!***

Chapter Scavenger Hunt

Partners: ______________________________ Date: _______

For each review question, the students are required to find the lesson in the chapter it came from (ie:7-3), what the *"essential question"* **was for that day, and solve the last question of "Exercises – Practice and Problem Solving", <u>example 1</u> section, ONLY, then lastly, answer the original question.**

Example: **Suppose you have 12 coins that total 32 cents. Some of the coins are nickels and the rest are pennies. How many of each coin do you have?**

<u>Section Lesson:</u> **7-4**

<u>Essential Question:</u> **How do I write *systems* of linear equations?**

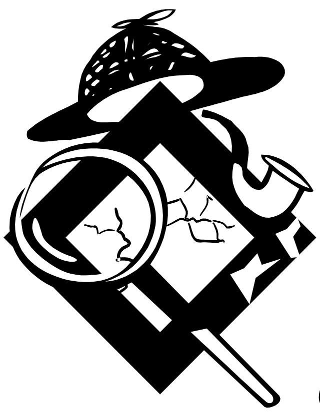
<u>Textbook Problem</u>: Pg. 365 #4 – Solve that problem. (Solve together as a class).

<u>Original Question:</u> **Solve the "above" question.**

Let 'x" = the number of nickels and "y" = the number of pennies.

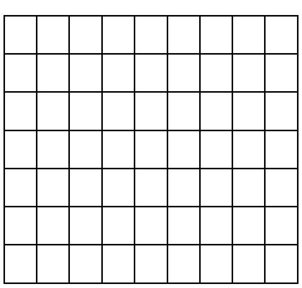
1) $x + y = 12$ **2)** $5x + y = 32$

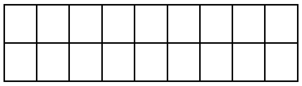
Solve the system. ***Answer*: <u>5 nickels and 7 pennies.</u>**



<u>On Your Mark, Get Set, Go!!!!!!!!!!!!</u>

#1. Graph this linear inequality: $2x + 3y < 6$

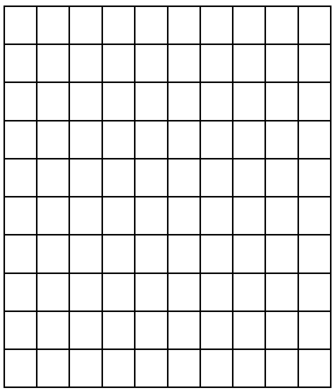




Section Lesson: ________

Essential Question: ____

Example 1- Last Question: Page ____, Number ____. Solve below. (A graph is provided in case you need it.)



#2. Solve the "system" by *substitution*. $x + y = 4$ **and** $y = 7x + 4$

Section Lesson: _______

Essential Question: ____

Example 1 – Last Question: Page ______ Number ____. Solve below.

#3. Solve the "system" by *graphing:* **$-4x + y > 3$ and $y + 1 \geq -2x$.**

<u>Section Lesson:</u> ________

<u>Essential Question:</u> ____

<u>Example 1 – Last Question:</u> Page ______ Number _____ Solve below.

#4. Write the system of equations to model the problem and solve.

“A chemist wants to make a 10% solution of fertilizer. How much water and how much of a 30% solution should the chemist mix to get 30 L of a 10% solution?

Make a table:

Answer: __________________________.

<u>Section Lesson:</u> _______

<u>Essential Question:</u> ____

<u>Example 1 – Last Question:</u> Page ______ Oops! That was the example problem. Let’s do the Practice by Example - #1, below.

Answer: _______________________

#5. Solve the “system” by *elimination:* $4x - y = 105$ and $x + 7y = -10$

Answer: ______________

<u>Section Lesson:</u> _________

<u>Essential Question:</u> ____

<u>Example 1 – Last Question:</u> **Page ______ Number ______. Solve below.**

<u>You Solved It – Good For You!</u>

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 40 *Warm-Up – Algebra With Pizzaz – pg. 8 "Did You Hear About…"Reviews evaluating expressions containing exponents.*

<u>Essential Question:</u> Can I make an "A", "B", or a "C" on my Chapter 7 test? What's the *next* chapter about?

<u>Objective(s):</u> 1.01 Write equivalent forms of algebraic expressions to solve problems. a) Apply the laws of exponents.

<u>"SAP":</u> The students will be involved in an *<u>"Exponential Investigation".</u>* (See attacked) Do you have the "know-how"** to be a "private investigator" to unlock the exponential mystery?**

<u>Lesson Anatomy</u>: Return Review Quiz #1. Clear up any difficulties. Check homework and warm-up. Ask students if they need to see any particular type of problem solved?

Pass out Chapter 7 test and allow students an hour to complete.

As students complete their tests, give them a copy of "*<u>Exponential Investigation".</u>*

Tell them to read the directions carefully. It looks like this… (TE pg. 394)

Investigation – Exponents

Look at the table below. Replace each _____ with the value of the power in simplest form.

2^x	7^x	10^x
2^4 = _____________	5^4 = _____________	10^4 = _____________
2^3 = _____________	5^3 = _____________	10^3 = _____________
2^2 = _____________	5^2 = _____________	10^2 = _____________

Look at your answer values. What pattern do you see as you go down each column?

Now, look at the table below.

2^x	5^x	10^x
2^1 = _______________	5^1 = ________________	10^1 = _________________
2^0 = _______________	5^0 = ________________	10^0 = _________________
2^{-1} = _______________	5^{-1} = ________________	10^{-1} = _________________
2^{-2} = _______________	5^{-2} = ________________	10^{-2} = _________________

What pattern do you notice in the row with 0 as an exponent? __________________

Complete each expression.

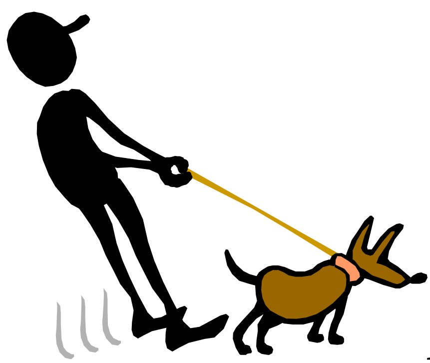
$2^{-1} =$ $2^{-2} =$ $2^{-3} =$

File this table in your notebooks when you have it completed.

<u>Summarizing Activity:</u> How about a "high-five" going out the door when the bell

rings?!

<u>Homework:</u> None – test day!



<u>Investigation – Exponents</u>

Name: ______________________________ Date: ______________________

Look at the table below. Replace each _____ with the value of the power in simplest form.

2^x	7^x	10^x
2^4 = ________________	5^4 = _________________	10^4 = ________________

2^3 = ____________	5^3 = _____________	10^3 = ____________
2^2 = ____________	5^2 = _____________	10^2 = ____________

Look at your answer values. What pattern do you see as you go down each column?

____

____

____.

Now, look at the table below.

2^x	5^x	10^x
2^1 = _______________	5^1 = ________________	10^1 = _________________
2^0 = _______________	5^0 = ________________	10^0 = _________________
2^{-1} = _______________	5^{-1} = ________________	10^{-1} = ________________
2^{-2} = _______________	5^{-2} = ________________	10^{-2} = ________________

What pattern do you notice in the row with 0 as an exponent? __________________

Complete each expression.

2^{-1} = **2^{-2} =** **2^{-3} =**

Have you solved the "Exponential" Mystery? **Y** **or** **N**

Algebra I Lesson Plans for Block Schedule

Day 41 *Warm-Up – Algebra With Pizzaz – pg 59. "Where Will Campers Sleep in 20 Years?" Reviews writing exponential expressions.*

Essential Question: How do I simplify expressions with *zero* and *negative* exponents, and then evaluate them?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
a) Apply the laws of exponents.

"SAP": The students will be involved in a "square" foldable game to solve "*Exhilarating Exponential Expressions*" (see attached for directions).

Lesson Anatomy: Pass back chapter 7 test. Clear up any problems; extend tutoring invitation.

Have students examine tables from "*Exponential Investigation*", from the previous day. Discuss patterns observed. Conclude that any number to the *zero* **power = 1.**

Examples: $4^0 = 1$ $(-2)^0 = 1$ $(1.02)^0 = 1$ $(\frac{1}{3})^0 = 1$

What about negative exponents?

$6^{-4} = \frac{1}{6^4}$ (-8)$^{-1} = \frac{1}{(-8)^1}$ (3.79)$^{-6} = \frac{1}{(3.79)^6}$

Can you use "0" as a base? 0^3 Think about it…any number to the *zero* power = 1. This suggests that 0^0 should = 1. But, look at this pattern…0^3 = 0; 0^2 = 0; 0^1 = 0; so shouldn't 0^0 = 0??? There can only be ONE answer, therefore, 0^0 is *undefined.*

On the overhead, do several "think-aloud"examples.

Simplify

a) $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

b) (-1.23)^5 =

c) (-5)$^{-2}$ =

d) (-7)^0 =

e) 3^{-3} =

Remind students to simplify fractional answers.

Next, explain that when you evaluate an exponential expression, you need to write the expression with positive **exponents before substituting values. Look at the following:**

Evaluate the following: $3m^2 t^{-2}$ **m = 2 and t = -3** **ME**

$$= \frac{3m^2}{t^2} = \frac{3(2)^2}{(-3)^2} = \frac{12}{9} = \frac{4}{3}$$

If n = -2 and w = 5: $n^{-3} w^0 = \frac{1}{n^3} . 1 = \frac{1}{-2^3} . 1 = -\frac{1}{8}$ **ME**

$$\frac{n^{-1}}{w^2} = \frac{1}{(-2)^1(5)^2} = \frac{-1}{50}$$ **WE**

$$\frac{w^0}{n^4} = \frac{1}{(-2)^4} = \frac{1}{16}$$ **WE**

$$\frac{1}{nw^{-2}} = \frac{1(5)^2}{-2} = \frac{25}{-2}$$ **WE**

Next, put students into pairs to solve:

TWO **Evaluate $4x^{2}y^{-3}$ for x = 3 and y = -2**

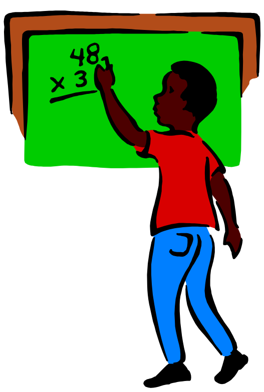
$$4(3)^{2}(-2)^{-3}$$

$$\frac{4(9)(1)}{(-2)^3} = \frac{36}{-8} = -\frac{9}{2}$$

Continue in pairs to solve "*Exhilarating Exponential Expressions*".
Allow 20 minutes to complete and then check.

Summarizing Activity: *To Be or Not to Be – "**Positive or Negative**"*? **Students are individually complete the table.**

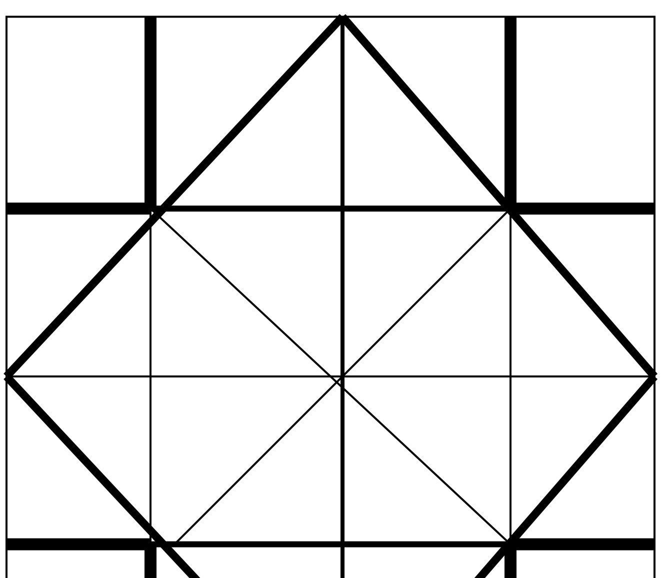
Homework: **Textbook – pg. 397 #14-44, (Evens Only).**



"Exhilarating Exponential Expressions"

Partners: ____________________________________ Date: ____________

Create foldable. Directions to fill in are below.



In the four corners, print one of the four colors of purple, blue orange, and green.

The two triangles touching the four corners are to be numbered 1-8.

The two triangles that form the angles of the inner rhombus shape are to have the following problems written on them. (There are 8.)

-7^{-2} = ? a = -2 and b = 6 $\therefore (3a)^{-2}$ = ? x = 3 and y = -1 $\therefore xy^{2}$ = ?

a = -2 and b = 6 $\therefore (3ab)^{-2}$ = ? Simplify $\frac{1}{x^{-7}}$ = ? Simplify $m^{2}n^{-9}$ = ?

1.67^{0} = ? $\frac{4}{4^{-3}}$ = ?

The person working the "square" will ask their partner to pick a color and spell it out while moving their fingers up and out. The person will then choose a number which will be counted while moving their fingers up and out. Lastly, the person will pick one last number choice. The "square" handler will then lift the triangle to give the person their exponential question to solve. The answer is in the most inner triangle below.

If the partner does not get the correct answer, then no point is awarded and the other person gets to do the asking.   Play the game, taking turns, for 15-20 minutes. Keep a tally. Award a small prize to the winning team member.

"To Be or… Not to Be… Positive or Negative" is the Question!

Name: ______________________________   **Date:** ____________________

Check whether the value of each expression will be *positive* **or** *negative.*

Questions	***Positive***	***Negative***
$\mathbf{-2}^{2}$		

$(-2)^{3}$		
$(-2)^{2}$		
2^{-2}		
$(-2)^{-3}$		

Write each number as a power of 10 using *negative* exponents.

$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10,000}$	$\frac{1}{100,000}$

Write each *expression* as a *decimal.*

10^{-3} = _______________

10^{-6} = _______________

$10^{-1} \cdot 7$ = _____________

$3 \cdot 10^{-2}$ = _____________

$5 \cdot 10^{-4}$ = ______________

Complete the pattern using powers of 5.

$\frac{1}{5^2}$ = _____________

$\frac{1}{5^1}$ = _____________

$\frac{1}{5^0}$ = ______________

$\frac{1}{5^{-1}}$ = ______________

$\frac{1}{5^{-2}}$ = ______________

How do you write $\frac{1}{5^{-4}}$ as a positive exponent? ________________

Rewrite $\frac{1}{a^{-n}}$ so that the power of "*a*"is in the numerator. __________

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 42 *Warm-Up – Math Smart – pg. 219 "Multiplying and Dividing Integers-Puzzle"*

<u>Essential Question:</u> How do I continue to work with exponents and use them in real-world problems?

<u>Objective(s):</u> 1.01 Write equivalent forms of algebraic expressions to solve problems. a) Apply laws of exponents.

<u>"SAP":</u> The students will solve "*<u>Those Darn Buzzin'Bugs!"</u>* on a giant bug template, which they will cut out and name for display.

<u>Lesson Anatomy</u>: Check warm-up and homework. Answer questions regarding any difficulties students had with homework problems.

Introduce students to a real-world problem from TE pg. 396-example 4. Share with the class that in the month of June and July, green peach aphids in a field of potato plants can double in population every three days! (See "bug" picture.)

You are a scientist studying these bugs. In your lab, the population doubles every week. You start out with an initial population of 1000 bugs. The *expression*,

$1000 \cdot 2^{w}$, models an initial population of 1000 insects after "*w*" weeks of growth.

So, to evaluate the expression: $1000 \bullet 2^{w} = 1000 \bullet 2^{0}$ = 1000(1) = 1000! Why does this make sense? (If w = 0, then, NO TIME HAS PASSED)

What if you were to evaluate the expression for *w* = -3, then, the expression would be: $1000 \bullet 2^{-3} = \frac{1000}{2^3} = \frac{1000}{8}$ = 125! What does this mean? Lead students to the conclusion that there must have been 125 aphids 3 weeks before the present population of 1000.

Can you tell me how many aphids there would be after 5 weeks? What's the expression?

$1000 \bullet 2^{5}$ = 1000 (32) = 32,000! Welcome to" Aphidstown!"

<u>Try this problem, since you are all experts at understanding exponents.</u>

A sample of bacteria triples each month. (Remember, some bacteria is good and some is bad) The expression, **$5400 \bullet 3^{m}$,** *models a population of 5400 bacteria after " m" months of growth.* **Evaluate the expression for** *m = -2 and m = 0.*

$5400 \bullet 3^{w} = 5400 \bullet 3^{-2} = 5400 \bullet \frac{1}{3^2} = 5400\left(\frac{1}{9}\right)$ = 600!

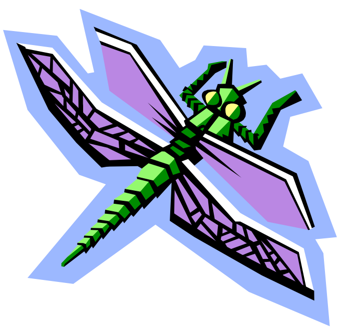
$5400 \bullet 3^{w} = 5400 \bullet 3^{0}$ = 5400(1) = 5400.

In the first expression, there were 600 bacteria 2 weeks <u>prior</u> to the 5400 population, and where the population is 5400, the time passed was 0!

Pass out "*<u>Those Darn Buzzin' Bugs".</u>* (Independent Practice – see attached)

<u>Summarizing Activity:</u> Ticket-on-the-Bus – Students will answer: a) have you ever heard of the math concept known as *scientific notation*? **b) Describe it, briefly.**

<u>Homework:</u> Grab & Go File – Practice 8-1, #37-52 only.



"Those Darn Buzzin' Bugs!"

Name: ______________________________ **Date:** _____________

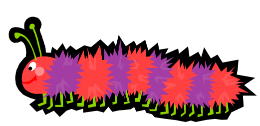
Simplify each expression.

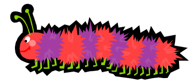
$\mathbf{3^{-4}}$ **=** ____________

$\mathbf{(-6)^{0}}$ **=** __________

$\mathbf{-2a^{0}b^{-2}}$ **=** _____________

$\frac{k}{m^3}$ **=** _______________





Evaluate the expression for *a* = 3, *b* = 2, and *c* = -4.

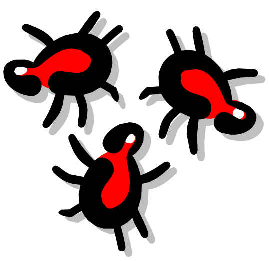
$a^{-b}b =$ ______________________

$c^{-a}b^{ab} =$ ____________________

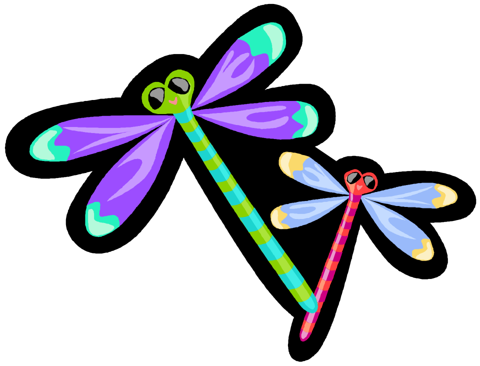
Simplify each expression.

$x^{5}y^{-7} =$ ____________________

$\frac{8}{2c^{-3}} =$ ____________________



A sample virus doubles each day. The expression 1500 • 2^{d} models a population of 1500 virus after "*d* "days of growth. Evaluate the expression for *d* = -3 and *d* = 1, below.



Great work!

Algebra I Lesson Plans for Block Schedule

Day 43 *Warm-Up – Algebra Quiz #2*

Essential Question: How do I write large numbers in scientific and standard notation, and *multiply* powers!?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
a) Apply the laws of exponents.

"SAP": Students will create an *8-sectioned foldable* **to model scientific notation and the multiplication properties of exponents.**

Lesson Anatomy: Check homework and warm-up. Address responses from the previous day's "ticket-out-the-door".

Ask students, "if you were asked to find the volume of the planet Jupiter, whose radius is approximately 69,111 km, would the answer be large or small?"

Demonstrate→ $V = \frac{4}{3}\pi r^3$. Plug the numbers into the calculator and observe. The response is 1,382,706,933,000,000. Who wants to write that number often? NO ONE!!

Explain that *scientific notation* **is a shorthand way to write very large or very small numbers. Explain that the object is to move the decimal in the original number so that there is only ONE digit, to the left of it. That means the volume of Jupiter is**

$1.382706933 \times 10^{15}$ - What does the 15 represent? The number of "*swoops*" to move the decimal so that ONE digit only, is to the left.

Explain that scientific notation is written as a product **of two factors in the form:**

$a \times 10^{n}$, where n is an integer and $1 \leq a < 10$. Knowing this, is each of the following in scientific notation?

56.29×10^{12} - No; the number is still greater than 10
0.84×10^{-3} - No; the number is less than 1
6.11×10^{7} - Yes; why?
3.42×10^{-4} 79.03×10^{8} 0.1263×10^{5} 0.07044×10^{-10}

Work through examples 2, 3, and 6 from TE pg. 401/402, and practice from questions on page 403.

Follow up with skills check from pg. 405.

Pass students a sheet of colored paper, 2 markers, and scissors. Make a vertical 8-section foldable, cutting the front of the fold to flip open/shut.

On the top fold have students write the problem: 7^{7} Inside the flip, show the expansion as $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$ the same as $\underline{7 \cdot 7 \cdot 7 \cdot 7 \cdot 7} = 7^{5} \cdot \underline{7 \cdot 7} = 7^{2}$, but $7^{5} \cdot 7^{2} = 7^{7}$! What about $\underline{7 \cdot 7 \cdot 7} = 7^{3} \cdot \underline{7 \cdot 7 \cdot 7 \cdot 7} = 7^{4}$, but $7^{3} \cdot 7^{4} = 7^{7}$! Do you see a pattern?
Lead discussion to the conclusion that if the base is the same number, and you are multiplying that base to a given exponent by the same base to a given exponent.

So, $11^{4} \cdot 11^{5} = 11^{4+5} = 11^{9}$

$4^{5} \cdot 4^{2} \cdot 4^{-3} = 4^{5+2-3} = 4^{4}$

$5^{-2} \cdot 5^{2} = 5^{-2+2} = 5^{0} = 1$

Work through examples 2, 3 and 5, with practice follow-up questions to complete the foldable.

<u>Summarizing Activity:</u> "Ticket-Out-The-Door" – Write the rule for multiplying

Exponents.

<u>Homework:</u> Complete <u>"Set the Table"</u> (see attached)

<u>Review Quiz #2</u>

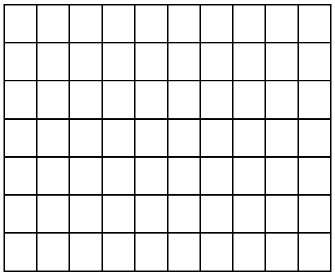
Name: ____________________

Date: ____________________

1. ***Simplify*:** **$2(3a - b) - 3(2a - 4b) =$**

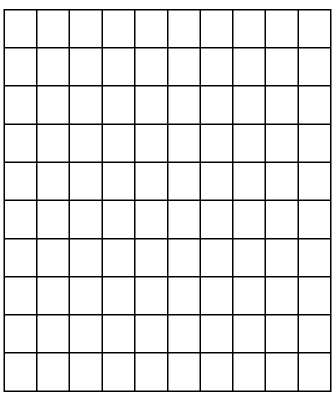
2. ***What is the "x-intercept" of the graph of the equation:*** **$4x + 5y = 12$?**

3. ***Graph:*** **$2x - 3y < 6$**



4. Solve: $\frac{2}{3}(2x - 1) - \frac{1}{2}(x + 3) = x + 5$

5. Graph the line whose slope is $\frac{3}{5}$ and whose y-intercept is -2.



6. Write the equation of the line that contains (2, -1) and (4, -1). Express answer in standard form.

7. Put the equation $\frac{2}{3}(x - 2y) + \frac{1}{2}(2x + y) = 8$ in slope-intercept form.

8. Solve $2x - 3(4x - 5) < 2x + 8$ if $x \in$ $-2, -1, 0, 1,$.

9. Solve for *l*: $P = 2l + 2w$

10. Solve: $|3x - 2| = 10$

Can You Set The Table?

Name: ___________________ Date: ________

Selected Masses (kilograms)

	Standard Notation	Scientific Notation
Elephant		**5.4×10^{3}**
Adult Human	**70**	
Dog	**10**	
Golf Ball	**0.046**	
Paper Clip		**5×10^{-4}**
Oxygen Atom	**0.00000000000000000000000003**	

Simplify each expression.

$c^{-2}c^{7} =$	$5t^{-2} \cdot 2t^{-5} =$	$(-2m^{3})(3.5m^{-3}) =$
__________	______________	______________

$(x^5 y^2)(x^{-6} y) =$ $a^6 b^3 \cdot a^2 b^{-2} =$ $-m^2 \cdot 4r^3 \cdot 12r^{-4} \cdot 5m$

________________ ________________ ________________

$(2 \text{ x } 10^3)(3 \text{ x } 10^2) =$ $(4 \text{ x } 10^6) \cdot 10^{-3} =$ $(8 \text{ x } 10^{-5})(7 \text{ x } 10^{-3}) =$

________________ ________________ ________________

Algebra I Lesson Plans for Block Schedule

Day 44 *Warm-Up – Algebra With Pizzaz – "According to Some Students, What is the True Purpose of Homework? (Reviews finding slope and y-intercept of a line, given its equation.)*

Essential Question: What is the "*multiplication property of exponents*" that allows me to raise a power **to a** power, **and a product to a** power?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
a) Apply the laws of exponents.

"SAP": Note taking; Partners to complete "Power" Crisscross X!

Lesson Anatomy: Check homework and warm-up. Review by having students record the answers to the skill check # 1-8, TE pg. 411. Show geometry application by answering pg. 408 - #4-43.

Pass out investigation table below.

Power Investigation

	Expand	Rule	Answer
$(3^6)^2$			
$(5^4)^3$			
$(2^7)^4$			
$(a^3)^2$			

$(g^4)^3$			
$(c^3)^4$			

What is the pattern you observe? ____
Use the pattern to answer: $(8^6)^3$ ________________

State the Property of Raising a *Power* to a *Power*. $(a^m)^n$

Work through examples 1 and 2, providing additional practice for each. (TE 412)

Lead into raising a *"product"* to a power. Demonstrate how to solve:

a) $(5y)^3$ b) $(4g^5)^{-2}$ c) $(3t^0)^4$ d) $b^2(b^3)^{-2}$

Work through examples 4 and 5, with additional examples, time permitting.

Partner students: Pass out <u>"Power" Crisscross X.</u> Have students work together to complete the activity. (see attached) Check over and clear up any questions.

Give mini-quiz – lesson 8-4 (TE pg. 416)

<u>Summarizing Activity:</u> Inside/Outside circle – Students are to a) explain multiplying exponents when the bases are the same, b) raising a power to a power, and c) raising a product to a power. Give examples of each.

<u>Homework:</u> Textbook – Checkpoint Quiz #1 – pg. 416.

"P O W E R" Crisscross – X !

Partners: ________________________ Date: ___________

Simplify each expression. Join the question to the correct answer on the right.

$(c^2)^5$ ☻	☻ $\frac{1}{8y^{12}}$
$(a^5)^3 a^4$ ☻	☻ $-8a^9b^6$
$(t^2)^{-2}(t^2)^{-5}$ ☻	☻ $1024m^5$
$(4m)^5$ ☻	☻ 3.6×10^{25}
$(2y^4)^{-3}$ ☻	☻ c^{10}

$(c^{-2})^3 c^{-12}$ ☻ ☻ a^{19}

$(6 \times 10^{12})^2$ ☻ ☻ $\frac{1}{t^{14}}$

$(2 \times 10^{-3})^3$ ☻ ☻ $243x^3$

$3^2(3x)^3$ ☻ ☻ 8×10^{-9}

$(-2a^2b)^3(ab)^3$ ☻ ☻ $\frac{1}{c^{18}}$

Algebra I Lesson Plans for Block Schedule

Day 45 *Warm-Up – Magic Square.*

Essential Question: How do I *divide* powers with the same base and raise a quotient **to a** power**?**

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
a) Apply the laws of exponents.

"SAP": Students will create an organizer on construction paper to practice the process of dividing exponents. Students will be engaged in the game "I Have…Who Has…" as guided practice activity.

Lesson Anatomy: Check homework and warm-up. To begin, have students reduce the following fractions:

$\frac{5}{20} =$ $\frac{60}{100} =$ $\frac{10}{35} =$ $\frac{18}{63} =$ $\frac{5xy}{15x} =$ $\frac{3ac}{12a} =$

$\frac{6y^2}{3x} =$ $\frac{24m}{6mn^2} =$

Demonstrate how to expand: $\frac{3^7}{3^3} = \frac{3\bullet3\bullet3\bullet3\bullet3\bullet3\bullet3}{3\bullet3\bullet3}$ **to show it is equal to** 3^4

Repeat for $\frac{x^5}{x^2} = x^3$ **Ask students to identify the pattern that to divide powers with**

the same base, you *subtract* the exponents. $\frac{a^m}{a^n}$ = a $^{m-n}$.

Pass out a sheet of colored construction paper and a marker. Divide paper into 6 equal size sections. In <u>box 1</u> – copy the following problems:

$\frac{a^6}{a^{14}}$ = $\frac{c^{-1}d^3}{c^5d^{-4}}$ = $\frac{x^2y^{-1}z^4}{xy^4z^{-3}}$ = Demonstrate how to solve, with supporting explanation. In <u>box 2</u>, the students will copy the following problems to solve later: $\frac{b^4}{b^9}$ = $\frac{a^2b}{a^4b^3}$ = $\frac{m^{-1}n^2}{m^3n}$ = $\frac{p^3j^{-4}}{p^{-3}j^6}$ =

In <u>box 3</u>, work through: $\frac{3.5x10^7}{2.705x10^8}$ = $\frac{3.5}{2.705}$ x 10 $^{7-8}$ = 1.3 x 10 $^{-1}$ = 0.13

Additionally, $\frac{7.5x10^{12}}{2.5x10^{-4}}$ = $\frac{7.5}{2.5}$ x 10 ^{16} = 3.0 x 10 ^{16} Copy and solve the following, later, in <u>box 4</u>!

$\frac{2x10^3}{8x10^8}$ = ?

In <u>box 5</u>, demonstrate $\left(\frac{x}{y}\right)^3$ = $\frac{x\bullet x\bullet x}{y\bullet y\bullet y}$ = $\frac{x^3}{y^3}$. This leads to the property of raising a *quotient* to a *power* . Work through TE pg. 419, examples 4 and 5, with additional practice questions, to complete <u>box 6</u>.

Play "I Have…Who Has"(see attached). Give each student a card. Teacher begins.

<u>Summarizing Activity:</u> Ticket-On-The-Bus: Choose 2 students names from the class in the following problem: Person 1 and person 2 used different methods to simplify $\left(\frac{b^7}{b^3}\right)^2$.

Why are both methods correct? Person 1 - $\left(\frac{b^7}{b^3}\right)^2$ = $\frac{b^{14}}{b^6}$ = b^8!

Person 2 - $\left(\frac{b^7}{b^3}\right)^2 = b^4{}^{\;2} = b^8$ **!**

<u>Homework:</u> Grab & Go File: Re-teach 8-5 #1-16

MAGIC Square

Name: ______________________ Date: ____________

$\frac{2x+3}{4} - \frac{5x}{2} = \frac{x-8}{3}$	$y = \frac{1}{2}x - 3$	$F(x) = x^2 - 2x + 3$; $f(4) =$
$bc^{-6} \cdot b =$	$(r^{-5})^{-4} =$	$(3x^2y)(-2xy^3) =$
Graph: $2x - 3y \triangleright 6$	$x + y = 4$	Write the equation of

I Have… 5^7 **Who Has…** $\left(\frac{1}{x}\right)^3$	**I Have…** $\frac{1}{x^3}$ **Who Has…** $\left(\frac{2x}{y}\right)^5$
I Have… $\frac{32x^5}{y^5}$ **Who Has…** $\frac{c^{12}}{c^{15}}$	**I Have…** $\frac{1}{c^3}$ **Who Has…** $\frac{x^{13}y^2}{x^{13}y}$
I Have… “y”	**I Have…** $\frac{1}{cd^2}$

Who Has… $\frac{c^2d^{-3}}{c^3d^{-1}}$	**Who Has…** $\frac{3s^{-9}}{6s^{-11}}$
I Have… $\frac{s^2}{2}$ **Who Has…** $\left(\frac{6}{n^6}\right)^2$ **I Have…** $\frac{3}{2}$ **Who Has…** $\left(\frac{c^5}{c^9}\right)^3$	**I Have…** $\frac{36}{n^{12}}$ **Who Has…** $\left(\frac{2}{3}\right)^{-1}$
I Have… $\frac{1}{c^{12}}$ **Who Has…** $\left(\frac{2p}{5}\right)^3$	**I Have…** $\frac{1}{16m^{12}}$ **Who Has…** $\frac{5x^3}{(5x)^3}$
I Have… $\frac{8p^3}{125}$	**I Have…** $\frac{1}{25}$

Who Has… $\left(\frac{3a}{2b}\right)^{4}$	**Who Has…** $\left(\frac{3b^{2}}{5}\right)^{0}$
I Have… $\frac{81a^{4}}{16b^{4}}$ **Who Has…** $\left(\frac{2m^{5}}{m^{2}}\right)^{-4}$	**I Have…** 1 **Who Has…** $\left(\frac{4n}{2n^{2}}\right)^{3}$

I Have… $\frac{8}{n^{3}}$ **Who Has…** $\left(\frac{7t^{3}}{21t}\right)^{3}$	**I Have…** $\frac{t^{6}}{27}$ **Who Has…** $\frac{49m^{2}}{25n}$
I Have… $\left(\frac{7m}{5n}\right)^{2}$ **Who Has…** $\left(\frac{4x^{3}}{3x^{2}}\right)^{-3}$	**I Have…** $\frac{27}{64x^{3}}$ **Who Has…** $\frac{a^{8}}{a^{-2}}$
I Have… a^{10}	**I Have…** $\frac{1}{w^{4}}$

Who Has… $\frac{w^3}{w^8}$	**Who Has…** $\frac{(2a^7)(3a^2)}{6a^3}$
I Have… a^6 **Who Has…** $\left(\frac{2ab^6}{a^3b}\right)^{-2}$	**I Have…** $\frac{a^4}{4b^{10}}$ **Who Has…** x^5y^{-2}

I Have… $\frac{x^5}{y^2}$ **Who Has…** $\frac{r^5}{g^{-3}}$	**I Have…** r^5g^3 **Who Has…** $\frac{6}{t^{-4}}$
I Have… $6t^4$ **Who Has…** $\left(\frac{a^6}{a^7}\right)^{-3}$	**I Have…** a^3 **Who Has…** $(x^2n^4)(n^{-8})$
I Have… $\frac{x^2}{n^4}$	**I Have…** $\frac{5}{m^3}$

Who Has… $5m^5m^{-8}$	**Who Has…** $(2t)^{-6}$
I Have… $\frac{1}{64t^6}$ **Who Has…** $\frac{5^9}{5^2}$	

Algebra I Lesson Plans for Block Schedule

Day 46 *Warm-Up "Private Domain" (coordinate graphing activity)*

Essential Question: How do I *evaluate* "exponential" functions and graph it? How can I use an exponential model for a population of rabbits?

Objective(s): 4.04 Graph and evaluate exponential functions to solve problems.

"SAP": Create an "Exponential Function" booklet.

Lesson Anatomy: Check homework and collect warm-up. Pass out 2 large sheets of construction paper and an assortment of graphing grid sizes. Fold the construction sheets and staple along the left edge to create a 4-page booklet.

On the front page, write "Exponential Functions" and their name. Then, copy and write: 5^{-3} = $2 \bullet 3^4$ = $2 \bullet 3^{-2}$ = in a decorative fashion. Turn to the inside cover page and glue 3 graphing grids. Students are to graph y = 3x, y = 4x, and y = -2x.

Explain that "*exponential functions*" are functions written in the form: $y = a \bullet b^x$, where *a* is a nonzero constant, *b* is greater than 0 and not equal to 1, and *x* is a real

number. *Examples include: $y = 0.5 \bullet 2^x$ and $f(x) = -2 \bullet 0.5^x$*

On the first page, draw the following tables to illustrate how these functions can be evaluated for given values of the domain.

$y = 5^x$

x	5^x	y
2		
3		
4		

$t(n) = 4 \bullet 3^n$ for the domain, $-3, 6$

n	$4 \bullet 3^n$	t(n)
-3		
6		

Work through "check understanding" problems TE pg. 430 #1a, b, and c.

On the back of page 1, work through example 2 (TE pg. 431) and additional problem below example.

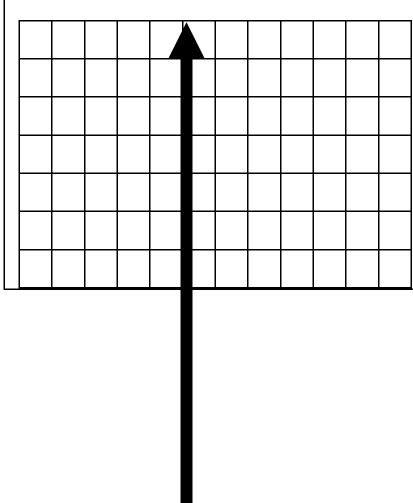
Copy and make a transparency of the two graphs in the middle of pg. 431. Ask students to contrast these graphs with linear graphs. (*curved, some curve up, others down, etc***)**

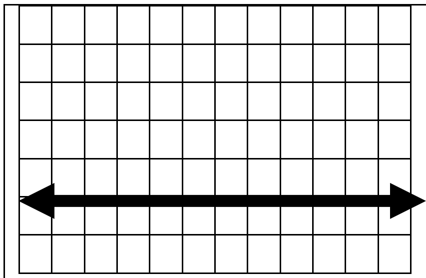
On the back of the first page, draw the following:

Graph $y = 3 \bullet 2^x$

x	$3 \bullet 2^x$	(x, y)
-2		
-1		
0		
1		
2		

Graph the ordered pairs below.





Graph *“check understanding” 3a, b, and c below.* Make a table first.

<u>Summarizing Activity:</u> Last 2 pages of booklet, allow students to work with a partner to complete TE pg. 432 example 4. Glue grids and complete pg. 433 #19, 20, 21, and 22.

<u>Homework:</u> Students are to evaluate for y = $\left(\frac{2}{3}\right)^x$ **for the domain** $-2, 0, 1$ **and graph y =** $\frac{1}{2} \bullet 4^x$**.**

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 47 *Warm-Up “Line Designs” Students will learn to create curves from straight lines.*

<u>Essential Question:</u> How can I model *exponential* growth and *exponential* decay? How does this relate to compound **interest I’m earning on my savings or paying out on my credit cards?**

<u>Objective(s):</u> 4.04 Graph and evaluate exponential functions to solve problems.

<u>“SAP”:</u> Note-taking and calculator exploration.

<u>Lesson Anatomy</u>: Ask for volunteers to demonstrate/discuss homework. Check warm-up.

As a review, demonstrate on the overhead (having the students graph on their calculators) how to graph the functions $y = x^2$ ***and*** $y = 2^x$**. Share TI-83 X-min as -5 and X-max as 4.4, and the Y-min and max as -1 and 10, respectively. The window should look like:**

x-min -5
x-max 4.4
x scl 1

y-min -1
y-max 10
y scl 1
x res 1

Observe and sketch each graph on graph paper. Next, ask "what happens to the graphs between x = 1 and
x = 3? Which one rises faster? Ask them to predict what the graph of $y = 6^x$ would appear as compared to aforementioned.

Ask students to recall from their pre-algebra studies how to find the interest for the principal *p*, interest rate *r*, and time *t* in years. What is the formula? *I = prt.* This is the formula for simple **interest. This is a *linear* formula and a** constantly **growing function because the same interest amount is being added to the account each year.**

But, as we put money in the bank, we are given interest based on our last balance. So our money grows by earning interest on top of previously earned interest. This is called compounding.

Solve finding the interest earned for: a) principal = $360; interest rate = 6% over a three year time period? Model on overhead to arrive at the answer $64.80. Repeat for the example: principal = $2500; interest rate 4.5% over 2 years and lastly, a principal = $1350; interest rate 4.8% over 5 years, 2 months.

Explain to students that *exponential* functions are widely used to model many types of growth **and** decay**. The graph of an exponential *growth* function rises from the left to the right at an average *increasing* rate while that of a *decay*, falls from left to right at an average *decreasing* rate.**

Although students may understand the word exponent**, share the following table to show what** *growing exponentially* **means.**

Multiply by 2	2 to the 2^{nd} exponent
2	2
4	4
8	16
16	256
32	65,536

Ask students which one grows faster?

Tells students that back when my daughter was born, in 1985, the cost of being hospitalized has increased 8.1% per year. Back then, room costs averaged $460 per day.

Let's write an equation to model the cost of hospital care.

$y = a \bullet b^x$ *Let "x" = the number of years since 1985*
Let "y" = the cost of hospitalization at various times
Let "a" = the initial cost in 1985 ($460)
Let "b" = the growth factor, which is *100% + 8.1% = 108.1% = 1.081*

Explain, that this is how you write the formula for "compound" interest, sometimes seen as $(1 + r)^x$ **.**

So, in the year 2000, what was the approximate cost per day?

$y = a \bullet b^x \rightarrow y = \$460 \cdot 1.081^{15}$ **How did I get the exponent 15? (2000-1985)**
$y \approx 1480!$ **WOW! What about last year 2003? The exponent would be 18 and the cost? _____________(use your calculator correctly)**

Repeat above process with the example from TE pg. 438 – Check Understanding 1.

Next, describe a "pretend" situation about one of your students…when he/she was born, they deposited $1500 into a special savings account that was paying 6.5% interest compound annually. (define) You are getting ready to graduate from high school and your parents will need the money for your college expenses. This was 18 years ago, remember, so what is your balance now?

$y = a \bullet b^x \rightarrow$ *Let "x" = the number of interest payments*
Let "y" = the balance
Let "a" = the initial deposit
Let "b" = 100% + 6.5% = 106.5% = 1.065

So… $y = 1500 \cdot 1.065^{18} = \$4659.98$ **WOW!!! Ask students to predict what the amount in the account would be if the interest were 8%, then, calculate.**

Then, explain what the interest calculations would be made on the previous example if it were compounded quarterly. Follow explanation – top of pg. 439 working through example 3.

Lastly, work through examples that illustrate exponential *decay*, applying the same formula. Explore examples from TE Pg. 440 and 441.

Summarizing Activity: **Financial "Know-How" – Planning for the Future. Partner students to work through 3 model scenarios. (see attached)**

Homework: Lesson Quiz 8-8 (typed on a sheet of paper) #1-6.

"Financial Know-How"- Planning for the Future!

Partners: ________________________ Date: ____________________

Work with a partner to solve the following problems. Show your equations and substitutions.

In 1998, the town of Reidsville had a population of about 13,000 people. Since then, the population has increased about 1.4% a year. Write an equation to model the population increase and solve.

Suppose you made a deposit of $1000 into your college account that was paying 7.2% interest compounded annually. What would the account balance be after 5 years?

What if the above account paid the interest quarterly? What would the balance be after 5 years.

Technetium-99 has a half-life of 6 hours. Suppose a lab has 80 mg of technetium -99. How much would be left after 1 day had passed?

Algebra I Lesson Plans for Block Schedule

Day 48 *Warm-Up – Algebra With Pizza- "Where Can You See the World's Biggest Rock Group?" (Reviews formulas)*

Essential Question: How can I get excited about my Chapter 8 test and be involved in today's review with my teacher?

Objective(s): 4.04, 1.01

"SAP": The students will be put into teams to "Take The A –Train" to test excellence. Teams will be timed rotating around the room to complete 6 review centers. Each team will receive a prize. The song "A-Train" will be playing to time students at each center. Allow one hour to complete the stations.

Lesson Anatomy: Check homework and warm-up. To review, put tables from TE pg. 443 # 40, 41, and 42 on the overhead. Students are to graph the functions on their calculators and tell whether the tables represent a *linear* or *exponential* function. Also, complete together, #43

Divide students into 6 teams of 4-5 students. Explain that each team will be timed to the music (like musical chairs) to complete the questions written on 4 index cards, taped to grouped desks. When the music stops, you must quickly finish the question you are on and when the music begins again, move to the next question in the center. If it will take you too long to finish the question, leave it and go on to the next card. Explain that each team will rotate to 6 different stations that highlight questions and content from each of the chapter's lessons. You may ask for help from your team members only.

Prizes will be awarded to team members after all questions have been checked. (The centers questions are described in the attached document for you to transcribe to index cards.) See attached.

<u>Summarizing Activity:</u> **"*Revolving Reflection*" – Have students line up at the front of the class with a pencil. Give the first person a sheet of paper that states, "This review was beneficial because?" Whisper the statement into the first person's ear and have them respond on the paper in a few words and/or short phrase (i.e. good examples, added practice helped, etc). When the student is finished, he/she returns to their desk and gets ready for the bell. The object is for everyone to share before the bell rings.**

<u>Homework:</u> Grab & Go file – Checkpoint quiz 1 and 2.

"Take the A-Train" to Excellence

<u>Index Cards 1-4</u>

Fill in the correct vocabulary word from the chapter. The vocabulary from the chapter includes: exponential growth, growth factor, interest period, scientific notation, exponential function, decay factor, and exponential decay.

1. The rule $y = 7^x$ is a (n) _______________ _________________.
2. For the function $y = a \bullet b^x$, where $a > 0$ and $b > 1$, b is the _________ _________________.
3. __________________ _______________ is calculated using both the principal and the interest that an account has already earned.
4. The function $y = a \cdot b^x$ models ______________ ______________.

5. ________________ ______________ is a shorthand way to write very large and very small numbers.

6. The function $y = a \cdot b^x$ models _____________ ____________ for decreasing growth.

7. For the function $y = a \cdot b^x$ where growth is decreasing, b is the ___________ ___________.

<u>Index Card 5-8</u>

Simplify each of the following.

$b^{-4}c^0d6 =$ $\quad\quad$ $\frac{x^{-2}}{y^{-8}} =$ $\quad\quad$ $7k^{-8}h^3 =$

Evaluate each expression for p = 2, q = -3, and r = 0.

$p^2q^2 =$ $\quad\quad$ $-p^2q^3 =$ $\quad\quad$ $p^q q^p =$

Is $(-3b)^4 = -12b^4$? Why or why not? ______________________________

<u>Index Cards 9-12</u>

Put the following in scientific notation.

$950 \text{ x } 10^5 =$ $\quad\quad$ $1.6 \text{ x } 10^{-6}$ $\quad\quad$ $0.84 \text{ x } 10^{-5} =$

Simplify each expression.

$2d^2d^3 =$ $\quad\quad$ $(5c^{-4})(-4m^2c^8) =$ $\quad\quad$ $(12x^2y^{-2})^5(4xy^{-3})^{-8} =$

$\frac{w^2}{w^5} =$ $\left\{\frac{21x^3}{3x}\right\} =$ $\left\{\frac{e^{-6}c^3}{e^5}\right\} =$

Index Cards 13-16

Simplify each quotient.

$\frac{4.2x10^8}{2.1x10^{-3}} =$ $\frac{5.1x10^5}{1.7x10^2} =$ $\frac{3.1x10^4}{12.4x10^2} =$ $-\frac{5.1x10^5}{1.7x10^2} =$

Evaluate each function for the given values.

$f(x) = 3 \cdot 2^x$ for the domain $1, 2, 3, 4$

$y = 10 \cdot (0.75)$ for the domain $1, 2, 3$

Index Cards 17-20

Identify the initial amount "*a*" and the growth or decay factor "*b*" in each function.

$y = 5.2 \cdot 3^x$ $\quad$ $y = 0.15 \cdot \left(\frac{3}{2}\right)^x$ $\quad$ $y = 7 \cdot 0.32^x$

Where does the graph cross the "y" axis?

$f(x) = 2.5^x$ $\quad$ $y = 0.5 \cdot (0.5)^x$ $\quad$ $f(x) = \left(\frac{1}{2}\right) \cdot 3^x$

The function $y = 25 \cdot 0.8^x$ models the amount y of a 25 mg dose of medicine remaining in the bloodstream after x hours. How many mg's of medicine remain in the bloodstream after 5 hrs?

<u>Index Cards 21-24</u>

<u>Graph:</u> $2 \text{ x } 10^x =$ $\quad$ $f(x) = 100(\cdot 0.9)^x$ $\quad$ $g(x) = \frac{1}{10}(0.1)^x$

$Y = 2(0.5)^x$

Algebra I Lesson Plans for Block Schedule

Day 49 *Warm-Up –Algebra With Pizzaz "What Do You Call Drilling 4,876 Holes?" (Reviews solving inequalities)*

Essential Question: How can I do well on my Chapter 8 test and what lies ahead in the week to come that's fun?

Objective(s): 4.04 Graph and evaluate exponential functions to solve problems.

"SAP": The students will be working with their TI-83 calculators and completing a "*graphic organizer*" on graphing "EXPONENTIAL FUNCTIONS in the form $y = a(b)^x$, where b > 0, based on drawn conclusions.

Lesson Anatomy: Check homework and warm-up. Share with students that after their test (allow 50 minutes), they are going to further explore "exponential functions" of the form $f(x) = a(b)^x$. Administer Chapter 8 test. Collect. Review and share characteristics of *exponential* graphs from previous lesson.

On their calculators, graph: $y_1 = 2^x$, $y_2 = 1^x$, **and** $y_3 = \left(\frac{1}{2}\right)^x$. **Below, compare.**

Next, on the calculator, graph: $y_1 = 2(3)^x, y_2 = 2(1)^x,$ **and** $y_3 = 2\left(\frac{1}{3}\right)^x$ **. Compare.**

Lastly, on the calculator, graph: $y_1 = 3(2)^x, y_2 = 5(2)^x$**, and** $y_3 = 2(2)^x$**. Compare.**

Discuss observations.

Share with students that the following day they will work in groups on an "M&M" Data Analysis activity. (That should wet their appetites!)

<u>Summarizing Activity:</u> 3-2-1. With a partner, describe <u>3</u> test questions that stood out in their minds as being difficult or easy, <u>2</u> characteristics of exponential functions observed in today's graphing of them, and <u>1</u> application example.

<u>Homework:</u> None – test day!

Algebra I Lesson Plans for Block Schedule

Day 50 *Warm-Up "What Do Sea Monsters Eat?" Algebra With Pizzaz- (Reviews vocabulary related to real numbers)*

Essential Question: **How do we graph and interpret exponential functions of the form $f(x) = a(b)^x$? (Continued from previous day.)**

Objective(s): 4.04 Graph and evaluate exponential functions to solve problems.

"SAP": Students will be working with a partner. Each group is given a paper cup, a napkins/paper towel, an M&M Data Analysis Lab Report, and a zip-lock plastic baggie containing 200-250 M&Ms.

Lesson Anatomy: Each group is to create a table of values based on the number of "spills"(*x*) and the number of M&Ms that land face up (*y*) from each cup spill. Each group must first count the number of M&Ms in their plastic bag. They are then put into the paper cup and very carefully spilled onto the unfolded napkin on their desk. The partners observe the "spill" and EAT any that do *not* land with the face up. (Students may decide not to eat them, but they must remove them.)

In the first section of the lab report (I), (see attached), students should record the number that were left with the "M" face up. These will be put back into the cup to be spilled again, with the students repeating the same process, for as many times as is needed, so no M&Ms are left face up. Record data with each spill.

Partners will then use their graphing calculators to interpret the graph from their input of the experimental data to decide which function is the best model – quadratic, exponential, or linear. Using the statistics function of the calculator, students will input their data analysis to find the "equation" of the "*best-fit*" function model. (It should model an "*exponential*" function in the form of $y = a(b)^X$.) The regression equation for their data should then be recorded in section (II) of the lab report. * *If students recorded data where y was equal to 0, this ordered pair should be*

deleted from the statistical list for the exponential regression to be completed on the TI -83.)

<u>Summarizing Activity:</u> Partners will examine the "goodness-of-fit" by looking at their correlation coefficient and "*interpret*" the values of "*a" and "b"* from the equation $\rightarrow y = a(b)^x$**. Lastly, they are to identify how accurate their "**<u>equation</u>**" is for predicting the number of M&Ms that were face up in spill #5. This should be recorded in section (III) of the lab report.**

<u>Homework:</u> Complete lab report with data hand-graphed on a grid.

Data Analysis Report

<u>Partners:</u> ________________ and _________________

<u>Section I</u>

Data Collection: Repeat spills until NO more M&Ms are left face up.

(x) = # spills	(y) = # of M&Ms left face up.

Section II

Enter the data into the graphing calculator and examine the graph. Decide which regression model is the "*best-fit*" for the data. Find the "function" **using that model.**

Regression model used for the *"best-fit"* function: ____________________________

Equation for the "*best-fit*" function: _________________________________

Section III

Ask each of the following questions of your partner.

What did *"a"* mean? ____

What did *"b"* mean? ____

What was the correlation coefficient? __________________________________

How accurate is the "*best-fit*" function equation for predicting how many M&Ms were left on the 5th spill? ______________________________________

If this were a perfect *exponential* **function, could y ever really be 0? ____ Why? ____**

What would be an example of other data that would model this type of function? ____

Does this model resemble some process you have studied or are studying in science? ____

Lab Rubric – M&Ms Data Analysis

Scores	**3**	**2**	**1**
Section I	**All of the steps were included in gathering the data and entering it into the table?**	**Most of the steps were included in gathering the data and entering it into the table.**	**Some of the steps were included in gathering the data and entering it into the table.**
Section II **Calculator Use**	**All data entered correctly. Correct model chosen. Correct regression equation written for the data.**	**Most data entered correctly and correct regression model identified.**	**Difficulty using the calculator, but some correct use identified.**
Section III **"Partner" Question/Answer responses and predictions.**	**All interpretations of *"a"* and *"b"* were correct; accurate prediction, "goodness-of-fit" correct, and conclusions completed.**	**5 of 7 conclusions correct.**	**3 of 7 conclusions correct.**

Partners:____________________ and __________________

Score:

Algebra I Lesson Plans for Block Schedule

Day 51 *Warm-Up "Sketching Functions II" Algebra With Pizzaz.*

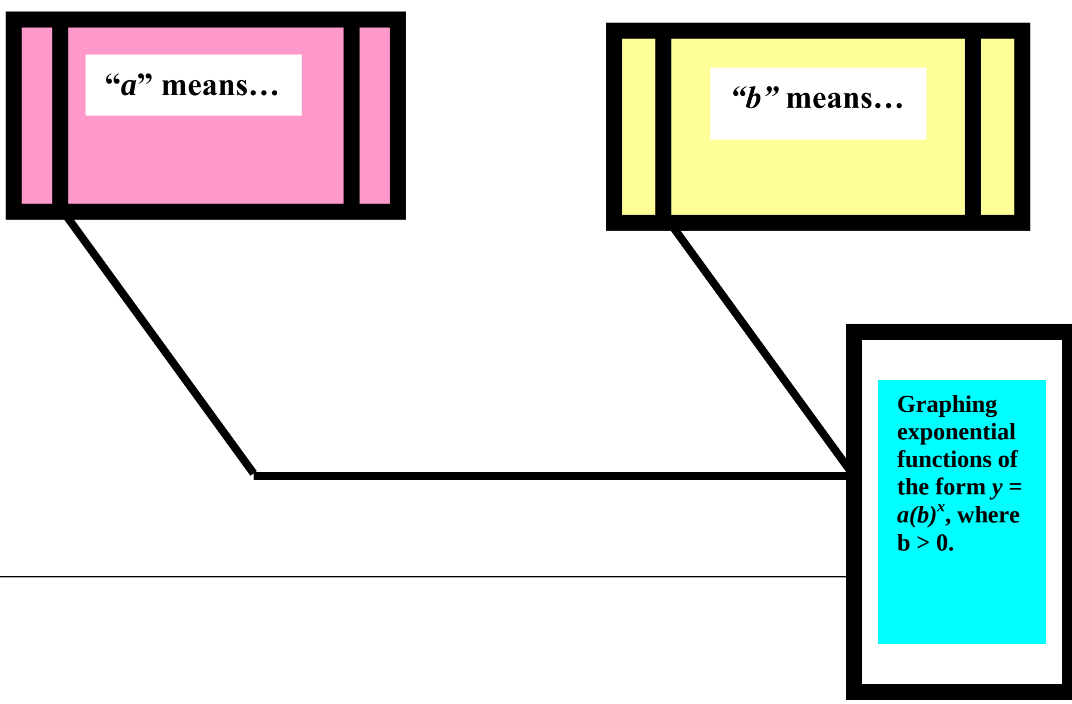
Essential Question: In what ways can I describe "polynomials"? What about addition and subtraction of polynomials? What's the deal?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
b) Operate with polynomials.

"SAP": Students will complete a review organizer and an introductory concept organizer. (See below) Note-taking.

Lesson Anatomy: Have a brief discussion about the M&M lab, and return lab reports from the previous day.

Review $y = a(b)^x$ **by completing the following graphic organizer.**



Share with students that in the next chapter (9), we are going to be exploring polynomials and learning how to "factor".

Explain that the word "<u>mono</u>mial" can be defined as being a "number", a "variable", OR a *combination* of the two! Have the student draw a T-chart. Put the following headings.

Examples	**NOT examples!**
12	$a + b$
"p"	$\frac{x}{y}$
$4x^3$	**7 – 5d**
11ab	$\frac{5}{a^2}$
$\frac{1xy^7}{3}$	$\frac{5a}{7b}$
$\frac{c}{3}$	$\frac{c}{x}$

$\frac{c}{x}$ **is NOT a monomial because there is a variable in the denominator!**

Review the "*powers*" rules by the following examples.

$(3a^6)(a^8) =$ ______ $(2c^4)(2c^3d^2)(-3cd^3) =$ ______________

$(2a^4b)^3(-2b)^3 =$ $\left(\frac{4x^6y5}{2x^2y6}\right) =$

Ask if each pair of "monomials" equivalent?

$2d^3$ $2d)^3$

xy^2 x^2y^2

- x^2 $-x^{\ 2}$

$5(y^2)^2$ $25y^4$

Discuss students' responses.

Next, discuss the phrase "*degree of a monomial".* Explain that it is simply the sum of the exponents of its members (monomial combinations). Zero has no degree as any nonzero constant.

Two "monomials" constitute a "binomial". (Hint: prefixes). Examples include 4y + 7, $\frac{2}{3}$ x -6, 5k + 6j, and -2x + 5. What is the degree **of** $9x^0$ **? 0!**

A "polynomial" is a monomial or the *sum or difference* of two or more monomials.

Look at the following example. $3x^4 + 5x^2 - 7x + 1$

$$\begin{array}{rcccc} & \downarrow & \downarrow & \downarrow & \downarrow \\ \textbf{\textit{degree}}\rightarrow & \mathbf{4} & \mathbf{2} & \mathbf{1} & \mathbf{0} \end{array}$$

The *degree* = 4. If the variable is the same in each monomial, then the *degree* of the expression is the same as the *degree* of the monomial member with the largest exponent! Also, point out to students that the polynomial members should be written in descending order, for the highest to lowest exponent.

Examine the chart and further examples from TE pg. 457, in addition to, classifying examples.

Ask students to use their calculators to solve the following:
1/4x + 2/4x =
2y + 5y =
3$\sqrt{7}$ **+ 6**$\sqrt{7}$ **=**
-9pq – 5pq =

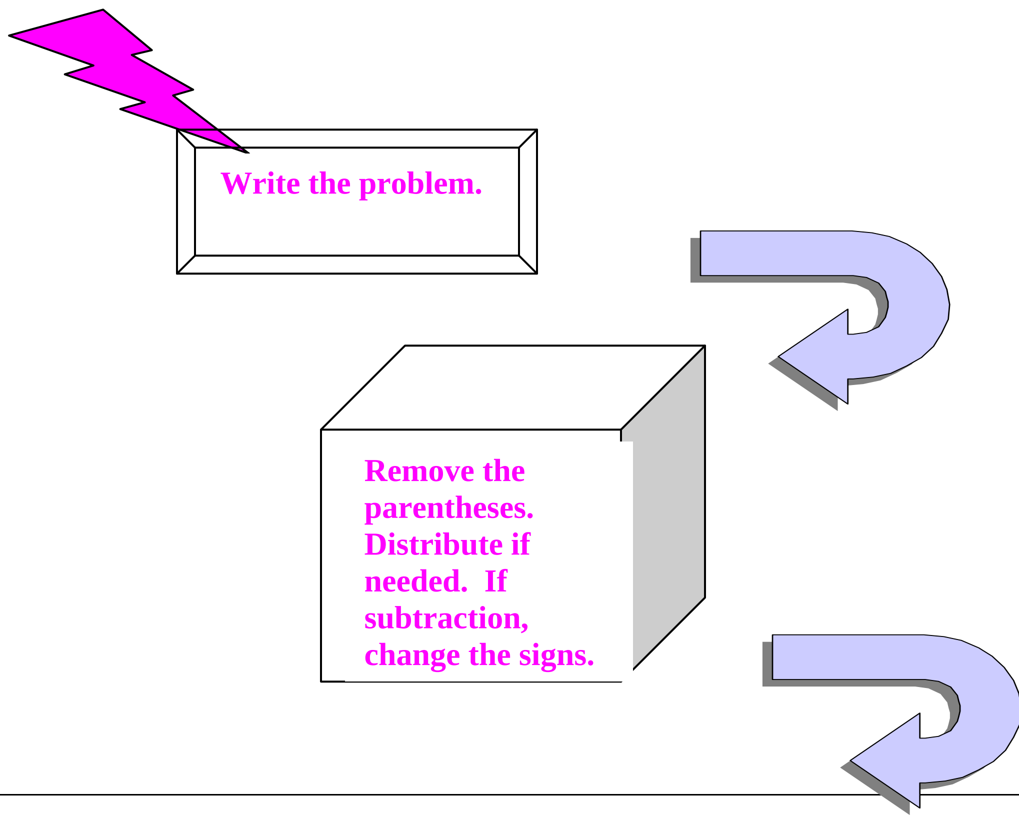
What do you notice about the pattern? (Add coefficients if alike!)
Predict the solution to:

a) 3y + 3 **Is it 9y^2 + 9? Why or why not? __________________________**
+ <u>6y + 6</u>

Share with students that this concept is involved when we add and subtract polynomials. Students are to complete the "advance" organizer to prepare for the

next day’s lesson.

<u>Adding and Subtracting Polynomials</u>



Combine "like" terms!

<u>Summarizing Activity:</u> **Have students write examples of polynomials. Group them into fours. Each member will identify the type, tell the degree, and name the coefficient for their example. Then, each member will pass their problem to repeat the steps, until each member has looked at each others.**

<u>Homework:</u> **Textbook – pg. 459 # 1-20.**

Algebra I Lesson Plans for Block Schedule

Day 52 *Warm-Up "What Did The Carpenters Call Their Bass Quartet (Reviews dividing polynomials by a monomial.) Algebra With Pizzaz.*

Essential Question: How do I add and subtract polynomials? What's the scoop?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
b) Operate with polynomials.

"SAP": Students will re-examine introductory organizer and apply it to examples demonstrated in class. Students will partner to play "MATHO" – Polynomials.

Lesson Anatomy: Check warm-up and homework. As a review ask the following questions:

What is the degree? 18 = $3xy^3$ **=** **6c =**

What's the standard form? -2 + 7x = ? $3x^5 - 2 - 2x^5 + 7x$ **=**

↓ ↓

What are its *degree* and form? ____

Referring back to the previous day's graphic organizer, re-visit the process of adding/subtracting polynomials. The "key" is to look for "like" terms!!!

Example 1: $(4x^2 + 6x + 7)$ **is added to** $(2x^2 - 9x + 1)$**→Remember to line up the**

problem, by exponents. Group like terms and demonstrate.

$$\begin{array}{r} 4x^2+6x+7 \\ +\ \underline{2x^2-9x-1} \\ 6x^2-3x+8 \end{array}$$

Model: $12m^2+4\ +(8m^2+5) \rightarrow \begin{array}{r} 12m^2+4 \\ +\ \underline{8m^2+5} \\ 20m^2+9 \end{array}$

Repeat for: TE pg. 458 "Check Understanding" # 3 b), c), and d). Model subtraction examples from "Example 4." Work through additional subtraction examples.

Model "geometry example" applications from TE Pg 459 # 39 & 40. Put several examples on poster-board for a "*revolving*" practice around the room. Divide students into pairs for "MATHO"-Polynomials Game. (*See attached***).**

<u>Summarizing Activity:</u> Students will work with a partner for "MATHO" – Polynomial Game!

<u>Homework:</u> Pr. 9-1 Evens Only!

M	A	T	H	O

Directions: **Using a pen, fill in your card with a random assignment of the numbers from 1-30. You will use only 25 of the 30 numbers. Do not use a number more than once. You will need pencil and paper to work out your answers. Any 5 in a row wins!!!**

1. $10x^2+3x-6$	**7.** $3x^2-x+11$	**13.** $20x-30$	**19.** $-3x+9$	**25.** $5xy$
2. $9x^2-5x-9$	**8.** $4x^2-3x+8$	**14.** $5x^2+x$	**20.** $-6x^2-2x-9$	**26.** $3x+7$
3. $-2x^2-3x-4$	**9.** $9x^2-13x+5$	**15.** $6x^2+11x$	**21.** $-2x^2-2x-5$	**27.** $2x+3$
4. $-5x^2-5x+1$	**10.** $-9x^2+5$	**16.** x^2+3x-2	**22.** $-2x$	**28.** $3x^2+2x-1$
5. $10x^2-13x+6$	**11.** $-2x+13$	**17.** $5x^2+3x+3$	**23.** $15x+10$	**29.** $5x^2-x+9$
6. $9x^2-12x+8$	**12.** $33x-44$	**18.** $6x-11$	**24.** $4x$	**30.** $4x-5$

Matho Game Problems – "Polynomials"

Problems:	Ans:	Problems:	Ans:
1. $(5x^2-9x+3)+(4x^2+4x-12)$	**2**	**16.** $(3x^2-5x+9)+(7x^2+8x-15)$	**1**
2. $(2x^2-9x+3)-(7x^2+4x-2)$	**4**	**17.** $7x^2-5x-2x^2+6x$	**14**
3. $(7x^2-8x+2)-(3x^2-5x-6)$	**8**	**18.** $8x-2-4x-3$	**30**
4. $3(2x^2-5)+5(4-3x^2)$	**10**	**19.** $2xy+6xy-3xy$	**25**
5. $8x-6x+x-5x$	**22**	**20.** $(3x^2-4x-5)-(2x^2-7x-3)$	**16**
6. $(-2x+4)-(x-5)$	**19**	**21.** $(x^2-5x-11)-(7x^2-3x-2)$	**20**
7. $5(3x-4)-6(4-3x)$	**12**	**22.** $x^2-8x+5-3x^2+5x-9$	**3**
8. $(5x^2-4x+7)-(2x^2-3x-4)$	**7**	**23.** $(8x^2-5x-1)-(3x^2-8x-4)$	**17**
9. $-4x+3x-7+4x-x+10$	**27**	**24.** $8(2x-3)-2(3-2x)$	**13**

10.	$(5x^2 - 9x + 3) - (-4x^2 + 3x - 5)$	**6**	**25.**	$(x^2 + 2x - 6) - (3x^2 + 4x - 1)$	**21**
11.	$3x^2 - 2x + 8 + x + 2x^2 + 1$	**29**	**26.**	$2x^2 - 9x + 3 - (-7x^2 + 4x - 2)$	**9**
12.	$(7x^2 - 5x + 2) - (-3x^2 + 8x - 4)$	**5**	**27.**	$7x + 4 + 8x + 6$	**23**
13.	$9x^2 - 4x - 3(x^2 - 5x)$	**15**	**28.**	$2x^2 + 3x - 4 + x^2 - x + 3$	**28**
14.	$4(3x - 2) + 7(3 - 2x)$	**11**	**29.**	$3x - 4x + 5 - 3x + 7x + 2$	**26**
15.	$(2x - 8) - (-4x + 3)$	**18**	**30.**	$7x + (2x - 5x)$	**24**

Algebra I Lesson Plans for Block Schedule

Day 53 *Warm-Up "Formal Feline" – Graphing Skills*

Essential Question: **How do I multiply a "*polynomial by a monomial*" and keep it all straight in my head? Then, how do I** "factor" **a monomial out of a polynomial?**

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. b) Operate with polynomials. C) Factor polynomials.

"SAP": Students will be engaged in the *"Polynomial Race"*. (See below)

Lesson Anatomy: Check warm-up and homework. Review by playing the "Polynomial Race". **Pair students and put their desks beside each other. Then, group four pairs to form a team. Pass out the** "*Polynomial Race*" **to the first partner in each team. When the teacher says, "Go!" the first group should complete the directions for partner group 1, write down their answer, and then pass the paper over their head to partner group 2 on their team. They follow the directions for group 2 and then pass the paper to the next group on their team, until the last group gets the paper. When they have completely written down their answer, they should raise their hands. The teacher is to verify the answers in the order they were raised. The first group to have the correct answers wins the top prize. Have a small token for each student. If a team gets an incorrect answer, the team members should gather with the back group to try and arrive at the correct response.**

"*Polynomial Race"*

Start with: $2x^2 - 3x + 1$

Partner Group 1: Add $\rightarrow -3x^2 - 4x - 2$ **to the "start" polynomial.**

Answer: ____________________

Partner Group 2: Subtract $\rightarrow 4x - 3$ **from the last answer.**

Answer: ____________________

Partner Group 3: Add $\rightarrow -4x^2 - 2x + 1$ **to the last answer.**

Answer: ____________________

Partner Group 4: Subtract $\rightarrow 3x^2 - 4x - 1$ **from the last answer.**

Answer: _____________________ **(***For the teacher only:* *answer* $-8x^2 - 9x + 4$**)**

Demonstrate application examples from TE pg. 459 # 39 and 40 to calculate the perimeter of the polygons.

Begin to focus on the day's lesson which involves a) multiplying a monomial by a trinomial, b) finding the greatest common factor, and c) factoring out a monomial. Emphasize the importance of using the distributive property carefully. Have students use colored markers or pencils to circle each monomial and arrow over to what is being multiplied in the parentheses. Work through Examples 1-3 with added "check understanding" problems for practice. (pages 462-463).

Summarizing Activity: ***One-On-One*** **– Have each student write two problems from the examples used during the lesson. One problem should have seemed easy and the other more difficult. Give the two problems to a partner to work, and then check each other's answers.**

Homework: Textbook – Mixed Review -pg. 465.

Algebra I Lesson Plans for Block Schedule

Day 54 *Warm-Up – Solving Systems of Equations by Elimination*

1) $3x - y = -1$, $-3x - y = 5$
2) $5x - y = -6$, $-x + y = 2$
3) $4x + y = 11$, $-6x + y = 11$
4) $3x + 4y = 19$, $3x + 6y = 33$

Essential Question: How do I multiply *binomials* using FOIL and multiply a "*binomial by a trinomial*"?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. b) Operate with polynomials.

"SAP": "Act-It-Out" problem solving strategy.

Lesson Anatomy: Check homework and warm-up. Start lesson by working from the overhead to complete several review questions from the "Check Skill's You'll Need" section of the text – top of pg. 467.

Lead into the lesson by sharing that today they will learn how to multiply binomials by a method called FOIL. Place 4 chairs beside each other at the front of the room. Ask for 4 volunteers to sit in them. Have them pretend they are at a red stop-light, in two separate cars with a *driver* and a *passenger*. Ask for a volunteer to pretend they are standing at a crosswalk waiting to get to the other side (from the left). Have the *walker* **begin crossing in front of the pretend cars. After he/she proceeds, stop and ask them to turn to the four in the cars and ask "who" would they see first in each of the cars (***and point to them***), passengers or drivers?** *passenger* **After the** *walker* **proceeds across a little further, ask to point to the people who are closest to each of the sidewalks;** *passenger on left, driver on right –"outside members".* **Then**

ask what two are closest to each other; *driver on left, passenger on right – "inside members".* **Lastly, after walking by both cars, who are the** *last* **in each car they would see? Both drivers. Review the positions.**

Further demonstrate the FOIL method by an array square. See below for the example:

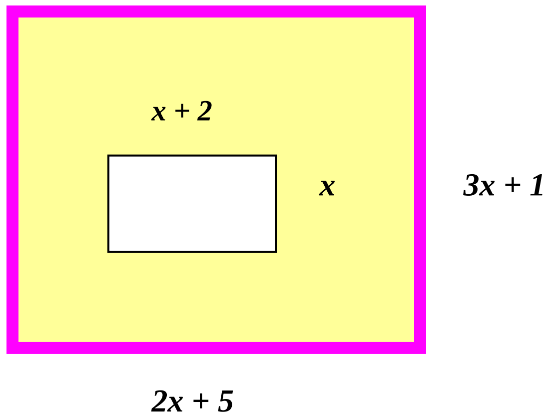
$x+2 \quad x+3 \rightarrow$ ***binomial* x *binomial***

	x	***3***
x	x^2	***3x***
2	***2x***	***6***

$x^2 + 5x + 6$

Model additional examples of: ***(2x + 3)(x + 4); (6h – 7)(2h + 3); (5m + 2)(8m – 1).*** **Emphasize that FOIL is simply implementing the *distributive* property. Have student's complete "Check Understanding" example 2 - #2 a. – d.**

Draw and model example 3 (TE pg. 468) – finding "area" application. See below.



Find *outer* rectangle area, area of the *hole*, and then <u>subtract</u> the two. Continue to practice with additional examples from textbook page 468 (bottom).

<u>Summarizing Activity:</u> Multiplying Binomials "*S c r a m b l e*". *(See attached)*

<u>Homework:</u> Grab & Go file – Re-teach 9-3.

Multiplying Polynomials

Name: __________________________

Multiplying Binomials Scramble

1. $(x - 4)(x + 9)$	$x^2 - 9x + 14$
2. $(x + 4)(x - 11)$	$x^2 + 9y + 18$
3. $(x - 3)(x - 2)$	$4x^2 + 12x - 8$
4. $(x + 5)(x + 6)$	$x^2 + 5x - 36$
5. $(x + 9)(x - 8)$	$x^2 - 7x - 44$

6. $4(x^2 + 3x - 2)$	**$4x^2 + 16x + 12$**
7. $(x - 6)(x + 1)$	**$x^2 + x - 72$**
8. $(x - 2)(x - 7)$	**$x^2 + 11x + 30$**
9. $(2x - 1)(x + 3)$	**$6x^2 + 19x - 7$**
10. $(x + 6)(x + 3)$	**$x^2 - 5x - 6$**
11. $(x + 3)(4x + 4)$	**$x^2 - 5x + 6$**
12. $(3x - 1)(2x + 7)$	**$2x^2 + 5x - 3$**

Algebra I Lesson Plans for Block Schedule

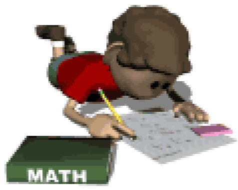
Day 55 *Warm-Up "Why Was the Engineer Driving the Train Backwards?" (Reviews factoring) Algebra With Pizzaz*

Essential Question: **How do I multiply special case** *binomials* **using the "FOIL" method.**

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. b) Operate with polynomials.

"SAP": **Students will take a mini-quiz and create a "Special Cases" placemat. (See below.)**

Lesson Anatomy: **Check homework and warm-up. Begin class with a mini-quiz.**



Mini "Polynomial" Quiz

Write each expression in standard form. Then, name each polynomial by its degree and number of terms.

1. $-4+3x-2x^2$ = ________________________

2. $2b^2-4b^3+6$ = ________________________

3. $(2x^4+3x-4)+(-3x+4+x^4)$ = ______________________

4. $(-3r+4r^2-3)-(4r^2+6r-2)$ = ______________________

Simplify

5. $-2x^2(-3x^2+2x+8)$ = _____________________________

6. Find the GCF of $16b^4-4b^3+8b^2$ = ________________

7. Factor $3x^3+9x^2$ = _______________________

8. **Factor** $10y^3 + 5y^2 - 15y$ = ________________________

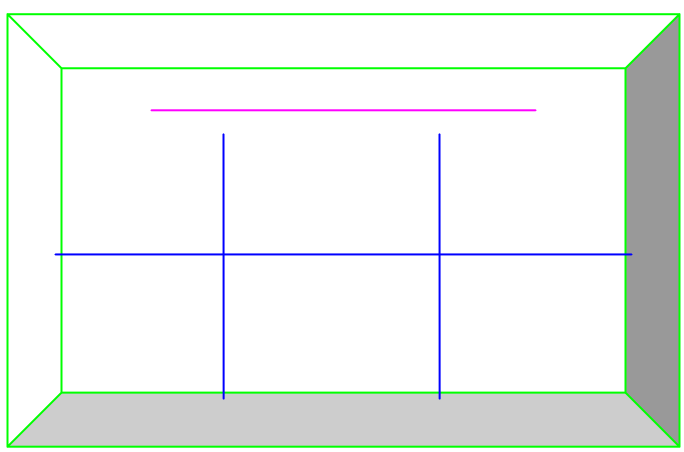
9. **Simplify** $\rightarrow -3g^7(g^4 - 6g^2 + 5)$ = __________________________

10. **Simplify** $\rightarrow 4y^2(9y^3 + 8y^2 - 11$ = __________________________

Score: ____________

Percent: _________

Pass out each student a sheet of construction paper, ruler, and marker. Have them divide the paper as shown below.



Have students write "Multiplying Binomials-*Special Products*" on the top-centered line. Divide the paper horizontally in half then, into thirds, lengthwise. Number the sections 1-6 going across and down. At the top of box 1, in small print, write

Sums; box 2 ***Differences;*** and, box 3 ***Difference of Squares*****.**

In box 1 put the example $(x + 7)^2$. Demonstrate how to FOIL. Put a box around the answer. Repeat for $(3a + 2)^2$ and $(5b + 7c)^2$, all in box 1. Move to box 2 and write $(c - 2)^2$. Continue to model the FOIL process and repeat for $(2b - 9)^2$ and $(4x - 3y)^2$. In box 3, model foiling $(n + 2)(n - 2)$. Observe answer. Repeat for $(m - 2n)(m + 2m)$ and $(6x - 5y)(6x + 5y)$. Clarify any problems.

Next, have the students copy the examples from below and place in the correct box (4, 5, or 6) and solve.

a) $(y + 10)^2$ b) $(p - 13)^2$ c) $(c - 3)(c + 3)$ d) $(2x - 8y)^2$

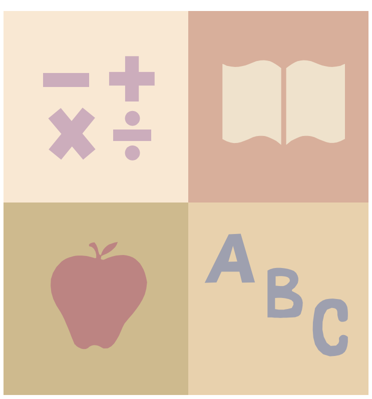
e) $(5t - 10)(5t + 10)$ f) $(b - 19)^2$ g) $(25x + 20y)(25x - 20y)$

h) $(2pq - 4s)(2pq + 4s)$

Request all answers be boxed in color. Check answers.

Summarizing Activity: **"Ticket-Out-The-Door" – On the ticket, write the rule of the "Difference of Squares" (pg. 476)**

Homework: **"*Foiled Again*" (See attached).**



Foiled Again!

Name: ____________________ **Date: ________________**

Match the problems below with the correct answers by connecting the dots.

$(a+ 7)^2$ • • $a^2 - 4ab + 4b^2$

$(a - 12)(a + 12)$ •	• **$25a^2 + 150a + 225$**
$(a - 2b)$ •	• **$64a^2 - 4b^2$**
$(4a + b)^2$ •	• **$49a^2 - b^2$**
$(7a + b)(7a - b)$ •	• **$a^2 + 14a + 49$**
$(6a - 2b)^2$ •	• **$16a^2 + 8ab + b^2$**
$(5a + 15)^2$ •	• **$a^2 - 144$**
$(8a - 2b)(8a + 2b)$ •	• **$36a^2 - 24ab + 4b^2$**

Algebra I Lesson Plans for Block Schedule

Day 56 *Warm-Up Math Smart "Fraction Cross-number Puzzle".*

Essential Question: How do I factor trinomials? What is "factoring", anyways?!

Objective(s): 1.01 Write equivalent forms of expressions to solve problems. c) Factor polynomials.

"SAP": Students will complete a "guided instruction packet" TGIF – "Thank Goodness I'm Factoring"**.**

Lesson Anatomy: Check warm-up and homework. Do a signaling activity with students as you as you make the following statements: Inverse means opposite? Subtraction is the inverse of addition? Division is the inverse of multiplication? Ask if anyone knows what the inverse of "squaring" is? Ask what operation is involved in the "distributive" property – lead to a discussion which concludes that *factoring* is the inverse of multiplication and vice versa.

Review that factoring can be done by finding the "greatest common factor"**. Examine the following:**

$8n^4 + 4n$

$6x^2y^3 - 3xy$

$10pq^5 + 8pq^2$

$-30m^3n^6 + 25m^2n^2$

$72k^2w^4 - 48kw$

Factoring can also be done by the "*difference of squares"* rule, as described in the previous lesson. Examples:

(x + 5)(x – 5)
(a + 4)(a – 4)
(w^2 + 2)(w^2 - 2)
(3y – 2)(3y + 2)
(2n + 4st)(2n – 4st)

Explain to students that they will now learn how to undo the multiplication of binomials (which produces a trinomial) by *factoring!*

Pass out "guided instruction packet" (TGIF – see attached) to each student.

Explain that there are 4 "generic" sign combination formulas for factoring trinomials. a) x^2 + bx + c b) x^2 - bx + c c) x^2 + bc – c and d) x^2 -bx – c .

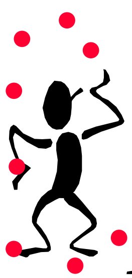
Look at the example, $x^2 + 7x + 12$. **Notice that both the middle and end sign are the same. Explain that to factor it, you have to find two numbers that multiply to give you 12(c) but add to equal 7(b). Illustrate the steps. In the first chart of the guided packet, work through several examples. Then, look at examples 2, 3, and 4. Place in the appropriate "graphics" in the packet with additional "check understanding" examples.**

<u>Summarizing Activity:</u> Divide students into pairs. Pass out the "Missing Link". Work together to solve the missing pieces, either working backwards or forwards. Check as a class when each partner group is complete.

<u>Homework:</u> Textbook – pg. 483-484. #22-54 – evens only!

T.G.I.F!!!!

Name: ________________ **Date:** ___________



Mental Math!

1. ______ **2.** ______ **3.** ____________________ **4.** ___________________

5. _________________

……………………………………………………………………………………………………........

Let's see now, yesterday, we … ____.

No Problem!!!!!

What if the *generic* trinomial looks like $\mathbf{x^2 + bx - c}$**?**

Example 1

= ( ) ( )

= ( ) ( )

= ( ) ( )

= ( ) ( )

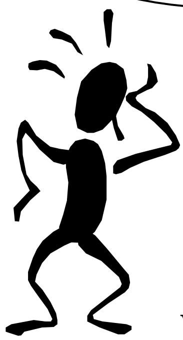
My Turn!

= ( ) ( )

= ( ) ( )

= ( ) ( )

$= (\qquad)(\qquad)$



What if the generic trinomial looks like x^2 - bx – c?
(YUK!!-2 minuses)

BUT…hey, I can handle it! Ya' know why????

<u>LOOK</u>

$= (\qquad)(\qquad)$

$= (\qquad)(\qquad)$

$= (\qquad)(\qquad)$

$= (\qquad)(\qquad)$

= (   ) (   )

The Missing Link

Partners: ________________________ Date: ___________

Each problem below has three parts to it, two of which are missing. Fill in the missing parts of each.

	A		B		C
Example:	$(x + 5)(x + 6)$	=	$x^2 + 6x + 5x + 30$	=	$x^2 + 11x + 30$
1.	$(x + 1)(x + 2)$	=	________________	=	________________
2.	______________	=	$x^2 + 2x + 3x + 6$	=	________________
3.	______________	=	________________	=	$x^2 + 11x + 18$

4. (x - 5) (x - 5) = ____________________ = __________________

5. ________________ = x^2 - 3x – 3x + 9 = _________________

6. ________________ = ____________________ = x^2 + 10x + 21

7. (x + 9) (x – 5) = ____________________ = __________________

8. ________________ = ____________________ = x^2 - 4x + 4

Algebra I Lesson Plans for Block Schedule

Day 57 *Warm-Up "Where Do Tadpoles in the Pawn Shop Come From?" (Reviews factoring by GCF) Algebra With Pizzaz.*

Essential Question: How can I get really good at factoring simple trinomials – can we play a game?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. c) Factor polynomials.

"SAP": Complete graphic organizer "Factoring Completely".

Lesson Anatomy: Check warm-up and homework. Clear up any difficulties.

Examine the following graphic organizer, below.

1. ______________________	**1.** ______________________
2. ______________________	**2.** ______________________
3. ______________________	**3.** ______________________

GCF

Factoring Completely

Difference Of Squares

Trinomials

1. ______________________ (   )(   ) 4. ______________________

2. ______________________ (   )(   ) (   )(   )

3. ______________________ (   )(   ) 5. ______________________
(   )(   )

Work through examples of factoring by GCF, Difference of Squares, and trinomials to recap steps.

Together, work through several challenge factoring problems from the bottom of TE pg. 484 # 57-64.

Partner students to play "Polynomial Matho" game for practice and PRIZES!!! (See attached).

Allow 15 minutes to administer Lesson Mini-Quiz 9-5 (TE pg. 484) for a grade.

Summarizing Activity: **Ticket Out The Door: Have students create a chart showing the signs of the factors of quadratic trinomials for the four cases of operation signs possible for a trinomial.**

Homework: **Mixed Review – pg. 485 #72-86 evens only.**

M	A	T	H	O
		☺		

Work with a partner. You will use pencil and paper to help solve the problems. In any order, put one number in each square, 1-30.

1. (x+1)(x+1)	**6. (x-6)(x+1)**	**11. (x-4)(x+1)**	**16. (x-1)(x-1)**	**21. (x-7)(x-3)**	**26. (x+2)(x+2)**
2. (x-8)(x+4)	**7. (x+6)(x+1)**	**12. (x-4)(x-1)**	**17. (x+3)(x+3)**	**22. (x-5)(x-4)**	**27. (x-7)(x+3)**
3. (x+8)(x-4)	**8. (x-5)(x-3)**	**13. (x+4)(x+1)**	**18. (x+8)(x+4)**	**23. (x+5)(x-4)**	**28. (x-3)(x-3)**
4. (x+6)(x-1)	**9. (x-2)(x-2)**	**14. (x+4)(x+4)**	**19. (x+7)(x+3)**	**24. (x-5)(x+3)**	**29. (x+7)(x-3)**
5. (x-6)(x-1)	**10. (x-4)(x-4)**	**15. (x+5)(x+4)**	**20. (x-8)(x-4)**	**25. (x-3)(x+2)**	**30. (x+5)(x-3)**

Matho Game
Factor a Simple Quadratic Trinomial

Problems	**Answers**
$x^2 - x - 6$	**25**
$x^2 + 5x - 6$	**4**
$x^2 - 4x - 21$	**27**
$x^2 - 4x + 4$	**9**
$x^2 + 5x + 4$	**13**
$x^2 + 9x + 20$	**15**
$x^2 - 12x + 32$	**20**
$x^2 + 2x - 15$	**30**
$x^2 + x - 20$	**23**
$x^2 + 2x + 1$	**1**

x^2-5x+4	**12**
$x^2+8x+16$	**14**
$x^2+4x-21$	**29**
$x^2-2x-15$	**24**
x^2-7x+6	**5**
x^2+7x+6	**7**
x^2-6x+9	**28**
$x^2-8x+15$	**8**
$x^2+12x+32$	**18**
$x^2-4x-32$	**2**
x^2-2x+1	**16**
x^2+4x+4	**26**
x^2-3x-4	**11**
x^2+6x+9	**17**
$x^2+10x+21$	**19**
$x^2-9x+20$	**22**
$x^2-8x+16$	**10**
$x^2+4x-32$	**3**
x^2-5x-6	**6**
$x^2-10x+21$	**21**

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 58 *Warm-Up "Cryptic Quiz" (Reviews solving an equation for "y".)*
<u>Algebra With Pizzaz.</u>

<u>Essential Question:</u> How do I factor a trinomial when the coefficient for "a" is greater than 1 – YIKES!

<u>Objective(s):</u> 1.01 Write equivalent forms of algebraic expressions to solve problems. c) Factor polynomials.

<u>"SAP":</u> The students will create a tri-foldable from construction paper, markers, and colored pencils.

<u>Lesson Anatomy</u>: Check warm-up and homework. Review by working through problems from "Skills Check You'll Need" (top TE pg. 486.)

Point out to students that by the method of FOIL, it is easy to see in the example below,

$(2x + 3)(5x + 4) = 10x^2 + 23x + 12$ that the following characteristics are present:

↑→→→→→→→↓ "product is "a""

(? x + __)(? x + __)

↓→→→→→→→→↑ "product is "c"

↓→→↑ "sum of products is "b"

Work through "Example 1 (TE pg. 486: $6n^2 + 23n + 7$)

Continue with additional "check understanding example", where "c" is positive!

Work through "example #2, where "c" is negative, and lastly, where you MUST *factor* out a monomial, first!
Look at example #2!

$7x^2$	
	-8

Enter the first and last terms as shown.

Multiply the numbers. Then, find factors of the product that have a sum of "b". Fill in the other 2 sections as shown:

$7x^2$	**+ 2x**
-28x	**-8**

The binomial factors are (x – 4)(7x + 2). Work through additional examples 1, 2, and 3 from TE pg. 487, plus "check understanding" practice. Continue with a practice "relay race". Continue to work through examples on pg. 488, presenting challenge questions.

<u>Summarizing Activity:</u> 4-2-1! Using color, have students partner in some manner. Look at examples: $3v^2 + 10v - 8$ and $12m^2 - 5m - 2$. List 4 things you would do as first steps to solving…then two…then the answer. Describe the PROCESS!!!

<u>Homework:</u> Grab & Go File – Re-teach 9-6. Odds only.

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 59 *Warm-Up – Vocabulary Puzzle from Chapters 7, 8, and 9.*

<u>Essential Question:</u> **How do I factor "*perfect square*" trinomials as well as the *"difference of squares"*? Does this fit into geometry area?**

<u>Objective(s):</u> 1.01 Write equivalent forms of algebraic expressions to solve problems.
c) Factor polynomials.

<u>"SAP":</u> **The students will complete a factor table to make observations and predictions. They will examine color "squares" to answer application questions.**

<u>Lesson Anatomy</u>: Check homework and warm-up. To review, have the students answer each of the following questions:

Simplify: $(3x)^2$ = _____ $(5y)^2$ = _____ $(15h^2)^2$ = _____ $(2sb^2)^2$ = ______

$(c – 6)(c + 6)$ = _____________________ $(p – 11)(p - 11)$ = ___________________

$(4d + 7)(4d + 7)$ = ______________________ $(3ab + 2)(3ab – 2)$ = ________________

Look at the following table:

TRINOMIALS	**FACTORS**	**IDENTICAL ? Yes or No**
$x^2 + 6x + 9$	( )( )	
$x^2 + 10x + 9$	( )( )	
$m^2 + 15m + 36$	( )( )	
$m^2 + 12m + 36$	( )( )	
$k^2 + 26k + 25$	( )( )	
$k^2 + 10k + 25$	( )( )	

Ask students to describe the relationship between the *middle* **and** *last* **terms of the trinomials that have identical pairs of factors.**

Recall from a previous lesson, that $(a + b)^2 = (a + b)(a + b) = a^2 + 2ab + b^2$ AND

$(a – b)^2 = (a – b)(a – b) = a^2 - 2ab + b^2$ SO…

You can conclude that any trinomial in those above forms are *"perfect square trinomials"*! Their factors are 2 identical binomials.

For example: $x^2 + 10x + 25$ AND $x^2 - 10x + 25$ are *perfect square* trinomials –

$$x^2 + 10x + 25 \downarrow (x + 5)^2 \qquad x^2 - 10x + 25 \downarrow (a – 5)^2$$

Have students examine the example, $9g^2 + 12g + 4$. Lead them to see that the first and last numbers, 9 and 4, can be each written as the product of two identical factors, 3 and 2. The middle term, 12g, is twice the product of one factor from the first term and one factor from the last term →((3) x 2 = 6 x (2)) = 12!

Model examples 1 – 5, highlighting key concepts, with additional examples from each.

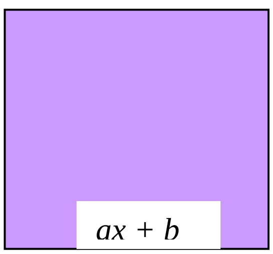
Examine each square. Find the side length of each.

$4m^2 + 20m + 25$

$49d^2 + 28d + 16$

$25g^2 - 40g + 16$

Examine the square below. The area of the square is $4x^2 + 28x + 49$. What is the sum of "a" and "b"?



Put students into quads and play "Factor Monopoly". (See attached)

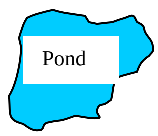
<u>Summarizing Activity:</u> *"Ticket-On-The-Train"* – Students have to answer the question, "what error did your classmate make"? It was solved as follows:
$4x^2 - 121 = (4x - 11)(4x - 11) = (4x - 11)^2$. ____________________________________

____.

<u>Homework:</u> Practice 9-7 – middle column only!

Factor Monopoly

Place markers here! **GO!** →	Factor: $x^2 - 4$	Factor: $3m^2 - 12$	Move down 3 spaces ↓	Factor: $25g^2 - 30g + 9$	**Lucky You!** **Roll Again!**	**GO TO JAIL!** NOW! ↓
Factor: $4m^2 - 81$ ↓	Factor: $r^2 - 144$	Factor: $w^2 - 256$	Move left 2 spaces ←	Factor: $100v^2 - 220v + 121$	Add 2 points to your Total.	Factor: $25q^2 - 9$ ←
You	Factor:	Move	Factor:	Factor:	Factor:	Factor:

messed up! Subtract 2 points! →	$5k^2-245$	down 2 spaces.	m^2-225	$3x^2+48x+192$	h^2-100	$16k^2-49$ ↓
Factor: m^2-36 ↓	Factor: $49y^2-4$	Factor: x^2-400	Factor: y^2-81	Go To Jail Now! Lose a Turn!	Move Left one Space.	Factor: $9c^2-64$ ←
Factor: $25w^2-196$ →	GO FISHING At the Pond!	Factor: y^2-900	Factor: $16p^2-64$	Factor: $7h^2-56h+112$	Factor: a^4-4	Factor: $3c^2-75$ ↓
Factor: $144p^2-1$ ↓	Factor: $64r^2-144r+81$	Move Right 2 Spaces. →	Factor: $36s^2-1$	**JAIL HOUSE *HERE* *Stay-visit one turn.***	Factor: $4n^2-121$	Go Fishing at the Pond! ←
Go To Jail! You're BAD! Lose a Turn.→	Factor: $2t^2-36t+162$	Factor: $100j^2-16$	Go back 3 spaces .	 Go back 3 spaces.	Factor: $k^2-14k+49$	You're The Winner! The End.

Choose a marker to play with. Put it in the first box. Roll the die and move accordingly. You will count 2 points for every correct answer. Follow the arrows to move. The first person to reach the End with the most points is the WINNER!

Algebra I Lesson Plans for Block Schedule

Day 60 *Warm-Up- Algebra I Review Quiz (See attached).*

Essential Question: How can I get ready for my Chapter 9 test? Hope we do something fun to review!

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. c) Factor polynomials.

"SAP": The students will be working in groups to devise a specific review activity to share with the class the next day

Lesson Anatomy: Check homework and collect review quiz. To review the material from this chapter, divide students into groups of five. Assign students to one of the following review sections:

Vocabulary (TE pg. 503#1-11)
Adding and Subtracting Polynomials (pg. 503 #13-18)
Multiplying a Polynomial and Factoring a Monomial from a Polynomial (pg. 504 #19-35)
FOIL, Multiplying Polynomials, finding the Square of a Binomial, and finding the Difference of Squares. (pg. 504 #36-52)
Factoring Trinomials (pg. 504 # 53-64)
Factoring Perfect Square Trinomials (pg. 505 #65-76)

Each group is to come up with an activity (mini-game, cards, puzzle, etc) to demonstrate the assigned concepts. They will have one class to collaborate, come up with an idea and then, sketch it on paper or describe what it is to look like. They will have half of the following day to finish their product and make a mini presentation. Lastly, each group will present. The grading rubric is as follows:

Creativity	**10 points**	
Group Member Participation	**10 points**	**(Each member must have an assigned**
Final Product	**15 points**	**role.)**
Presentation	**15 points**	
Total	**50 points**	

Summarizing Activity: **Students will play "Basketball Shootout Game" for drill and practice. Allow 30 minutes for this review game. The directions are as described.**

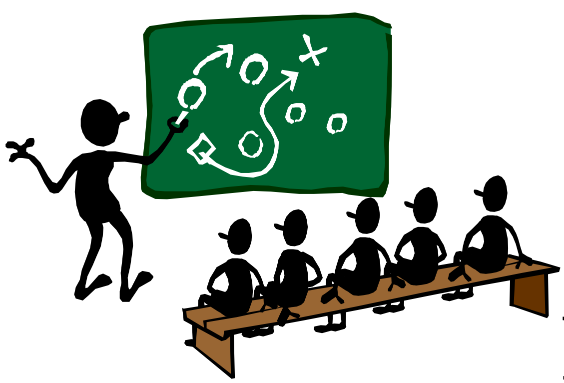
"Basketball Shootout Review Game"

1. **Divide the class into three teams. Each student in the team should pick a partner to work with during the game. They may only talk to their partner while working on a problem, *not* with other people on their team.**
2. **The game leader reads a problem or writes it on the board or overhead, if needed and allows enough time for all the partner groups to agree on their answer.**
3. **The game leader randomly calls on a partner group in Team #1 to give their answer.**
4. **If the answer is correct, Team #1 receives one point and a chance for bonus points by shooting a ball at a trash can placed on a desk against a wall. Masking tape is used to mark a "2 point line" and a "3 point line" on the floor in front of the basket. One try is allowed for the "2 point line" and two tries from the "3 point line". If the shot is made from the "2 point line", the team gets a total of 2 points, one for getting the question right and one for the**

shot. If the shot is made from the "3 point line", the team gets a total of 3 points, one for getting the questions correct, and two for the shot. No more than 3 points can be earned for each question.

5. If the answer is incorrect, the same question is asked of a randomly chosen partner in Team #2, without allowing any extra time to work. If Team #2 gets it right, then they take shots and earn points for their team. If they miss the question, then it passes to Team #3 until finally a team is able to answer the question correctly.
6. A new question will be started with the team coming after the one that received the last points, to keep the questions rotating fairly.
7. The team members with the highest number of total points at the end of the game, wins a prize.

Homework: Work on "specific parts" of their project *plus* 8 questions. Take from textbook – pg. 506 # 43-50.



Review Quiz !

OK Team… You can do it!

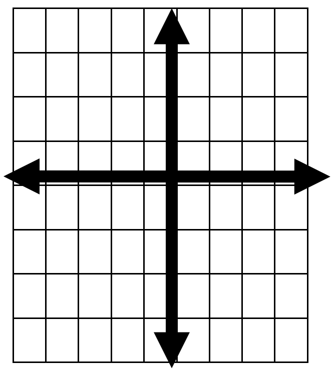
1. Find the error: $3 - 2x > 7$ $\quad\quad$ $(2^4)(2^3) = 4^7$

$$-2x > 4$$
$$x > -2$$

2. Solve: $|5x+3| = 2$

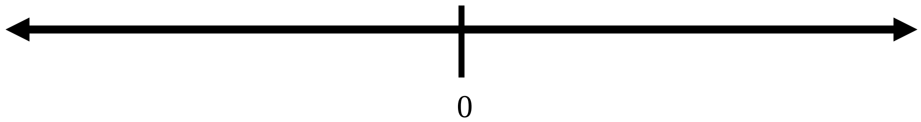
3. **Solve for "h": $A = 1/2bh$**

4. **Graph and find the solution to:** $2x - 3y = 0$
$y = x - 1$



5. $\dfrac{4a^3b^4 + 8a^2b^3}{2a^2b^2} =$

6. **Solve and graph on the number line.** $-5 \le 2x + 3 < 7$



7. Solve the following system of equations. $\quad 2a + b = 19$

$3a - 2b = -3$

Algebra I Lesson Plans for Block Schedule

Day 61 – ***Time will be devoted this period to finishing mini-projects and presentations.***

Essential Question: How can my group utilize this class time to finish our little review project assignment and presentation?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. c) Factor polynomials.

"SAP": Students will continue to use resources and materials to create their

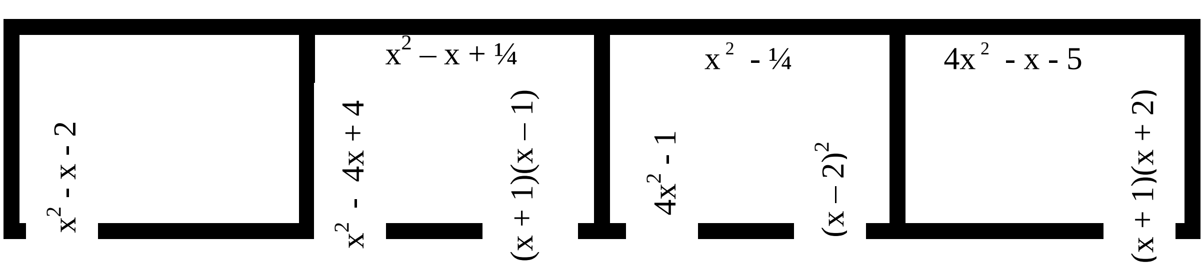
“review” product.

<u>Lesson Anatomy</u>: Check homework questions (8) and then, proceed to get into groups to finalize their review project and assign roles for the presentation. Allow at least 50-60 minutes to complete. Lastly, allow 30-40 minutes for each group to present their information and/or demonstrate how their game, etc. works.

<u>Summarizing Activity:</u> Group presentations!

<u>Homework:</u> Factoring “Puzzle” Cut-Out.

Factoring ***<u>Puzzle</u>***



$(4x - 1)(x + 5)$	$(2x + 1)^2$	($(3x + 4)(2x + 1)$	$(2x + 1)(3x - 2)$
$4x^2 - 4x + 1$ $2x^2 - 7x + 6$ $(x + 2)(x - 1)$	$4x^2 + 4x + 1$ $x^2 - 2x + 1$ $(6x-5)(4x-3)$ $(4x + 1)(x + 5)$	$4x^2 + 19x - 5$ $x^2 - 1$ $(2x + 1)(2x - 1)$	$x^2 + 4x + 4$ $(x + 1)(x - 2)$ $(x - ½)^2$
$x^2 + x + ¼$ $(2x + 1)(2x - 1)$ $(4x - 5)(x + 1)$	$4x^2 - 1$ $24x^2 + 2x - 15$ $(4x - 1)(x - 5)$	$x^2 + 2x + 1$ $(x + 2)^2$ $(x + ½)(x - ½)$	$6x^2 - x - 2$ $(2x - 3)(x - 2)$
$4x^2 - 21x + 5$ $x^2 + 4x - 12$	$(x + 1)^2$ $(x + ½)^2$	$6x^2 + 11x + 4$ $x^2 + 3x + 2$ $(x - 1)^2$ $(2x - 1)^2$	$4x^2 + 21x + 5$ $x^2 + x - 2$ $(x + 6)(x - 2)$

Cut out each box and match the questions to the right answers so they touch correctly.

Algebra I Lesson Plans for Block Schedule

Day 62 *Warm-Up "What Did the Toothless Old Termite Say When He Entered a Tavern? (Review: graphing "systems" of inequalities.)* Algebra With Pizzaz.

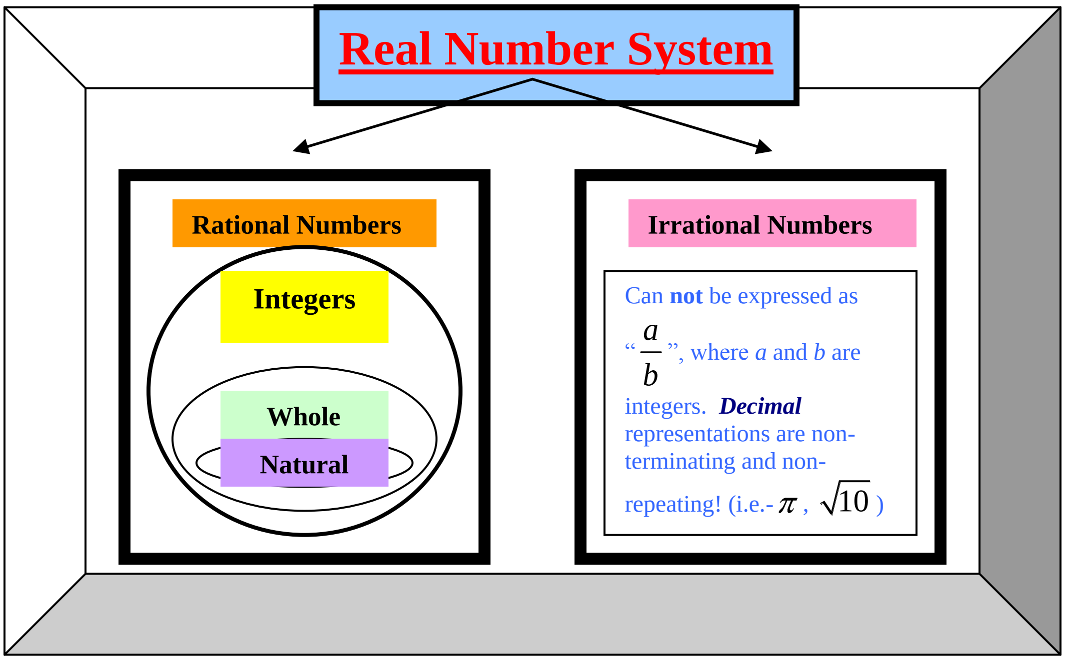
Essential Question: Hope I can do well on my Chapter 9 test; do you think so? What's up next on the *"algebra"* calendar?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems. b) Operate with polynomials.

"SAP": Students will take their Chapter 9 test during the first 50 minutes of class. During the lesson they will complete a graphic organizer to review real number concepts.

<u>Lesson Anatomy</u>: Check homework "factoring puzzles", clear up any questions, and solve warm-up. Administer Chapter 9 test.

Once the class has completed the test pass out the following organizer: Ask students to think back to the beginning of the semester when we discussed the Real Number System.



See attached for student version. Put examples of each group and subgroup of numbers.

Ask students to examine the following:

$$\frac{5}{7}, \frac{7}{12}, \frac{23}{13}, \frac{1}{x}, \frac{x+2}{x-3}, \text{ and } \frac{x^2-5}{x^2-10x+25}$$

Lead them to the observation that the first three fractions are all numbers and the last three have *variables* **in both the numerator and denominator. Explain that when this occurs, it is referred to as a <u>*"rational expression".*</u> Share that since the operation of division is involved, any values of a variable resulting in** *zero* **for a denominator are called "<u>*excluded values*</u>". Ask them to predict why? (undefined)**

Like rational numbers, "*rational expressions*" are in simplest **form if the numerator and denominator have no common factors except 1. For example:**

$\frac{x+5}{10x}$ **is in** *simplest* **form since neither 10 nor x is a** *factor* **of x + 5.**

$\frac{5m+3}{m+6}$ **is in simplest form since** $m + 6$ **is not a factor of** $5m + 3$**.**

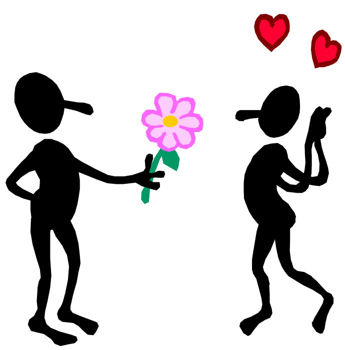
Model on the overhead, the following examples from TE. Pg. 652-653.

$\frac{15b}{25b^2} =$ $\frac{12a}{48a^2} =$ $\frac{6abc^3}{3a^2b^2} =$ $\frac{n+6}{3(n+6)} =$

Continue to work through examples 1-4 with additional examples from each section.

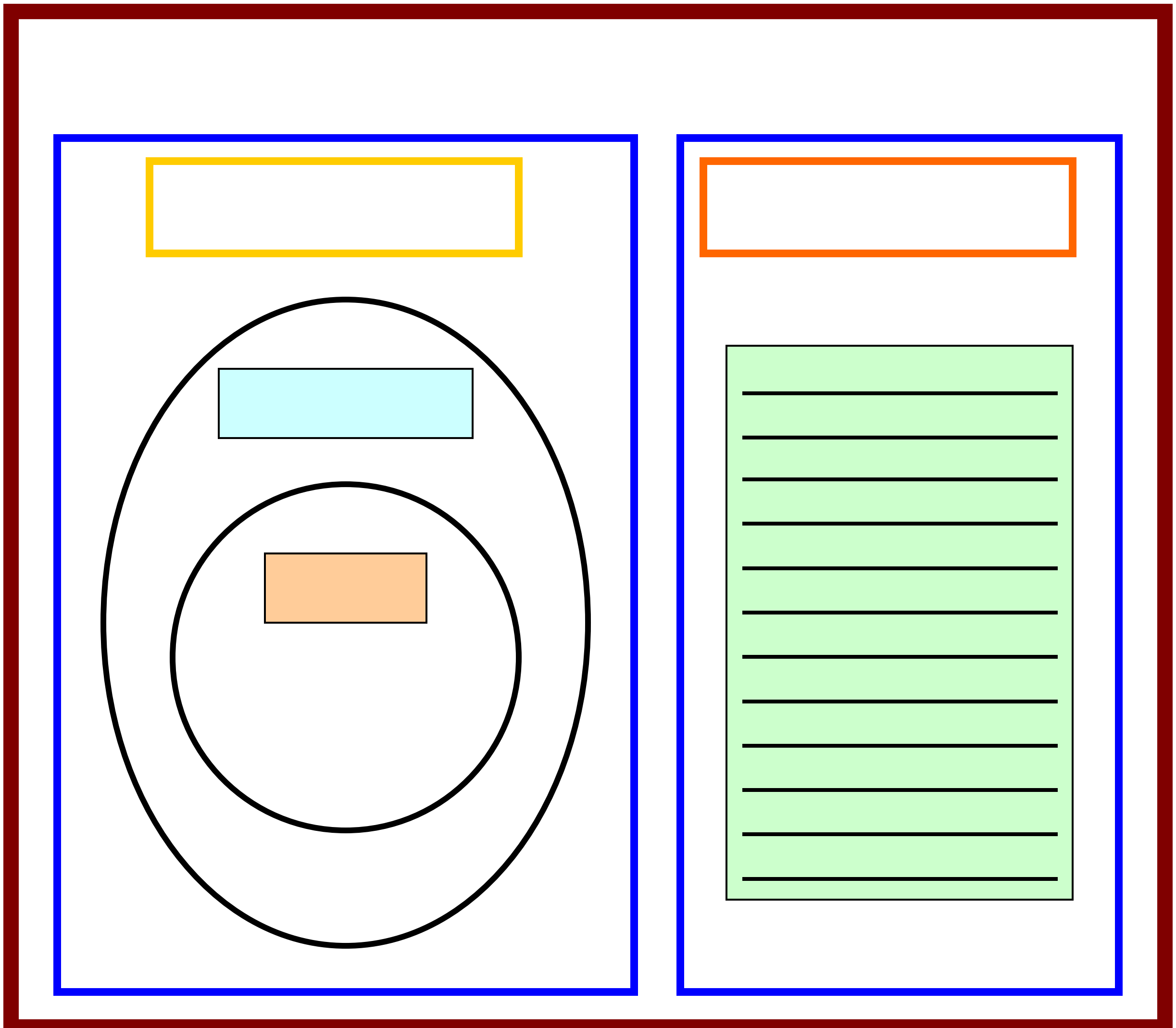
<u>Summarizing Activity:</u> Have students work with a partner to complete "<u>You Can Be a Star</u>".

<u>Homework:</u> Grab & Go File→ Pr. 12-3 #1-27, *odds* **only.**



<u>"Something Pretty…for You to Review"</u>

<u>Real Numbers</u>



You Can Be A Star

Name: ______________________________ Date: ___________________

Match each question with the correct answer. Connect the dots. Draw 4 additional dashed lines and your star will be complete. Color.

- $\frac{4x^2y^2}{16yx} =$

$\frac{x^2-4x-12}{x-6}=$

$\frac{3x+15}{x^2-25}$

• • •

$\frac{3(x-3)}{x+4}$

$\frac{y}{4x}$

x + 2

$\frac{3x^2-27}{x^2+7x+12}=$

• • •

$\frac{3}{x-5}$

•

Algebra I Lesson Plans for Block Schedule

Day 63 *Warm-Up –"Rational Expression" Tic-Tac-Toe*

Essential Question: Totally "radical"! What are radicals and how do I simplify radicals involving products?

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
a) Apply the laws of exponents.

"SAP": 4-section "hot dog" foldable to facilitate note-taking with examples.

Lesson Anatomy: Check homework and warm-up puzzle.

Ask students to remember the term "inverse" which means (opposite). Ask students to look at the following examples: 10^2 = 6^2 = 20^2 =
Solicit student responses asking what the "squaring exponent" means? Then, ask

them to examine the following: $\sqrt{100}$ = $\sqrt{36}$ = $\sqrt{400}$ =
Explain that "*taking the square root*" is the opposite of "*squaring*".

Share that the radical sign $\sqrt{\ }$ **has a "***radicand"* **(what is underneath the sign).**

Share that 2$\sqrt{3}$ **and** $\sqrt{x+3}$ **are radical expressions and that some radical expressions can be simplified.**

Look at the example: $\sqrt{54}$ **→it is not a *perfect* square but its factors can be.**

$\sqrt{54}$ **= √(9● 6) or** $\sqrt{9}$ **●** $\sqrt{6}$ **("9" is a perfect square** $\sqrt{9}$ **=3)**
= 3$\sqrt{6}$ **(now, it is simplified)**

$\sqrt{192}$ **= √(4●48) = 2√(4●12) = 2(2)√(4●3) = 2(2)(2)**$\sqrt{3}$ **= 8**$\sqrt{3}$ **.**

Demonstrate further examples: $\sqrt{50}$ =
$\sqrt{18}$ =
-5$\sqrt{300}$ =
Lead to conclusion→ $\sqrt{n^3}$ **= √n² ●√n = n**$\sqrt{n}$

Work through: $\sqrt{x^2}$ = $\sqrt{x^3}$ = $\sqrt{x^4}$ = $\sqrt{x^5}$ = $\sqrt{x^6}$ =
Explain that they have simplified each radical expression by removing "perfect square" factors.

Share that another way to simplify radical expressions is by removing "variable factors". Work through: $\sqrt{45a^5}$ =

$\sqrt{27n}$ =

$\sqrt{x^2y^5}$ =

-a$\sqrt{60a^7}$ =

Work through additional examples together (TE pg. 579).

Lastly, illustrate how to simplify radical expressions by "multiplying 2 radials". Work through examples 3 and 4 with practice questions.

<u>Summarizing Activity:</u> Partner students to "Follow the *Radical* Brick Road"

Homework: **Re-teach 11-1 (From Grab & Go File)**

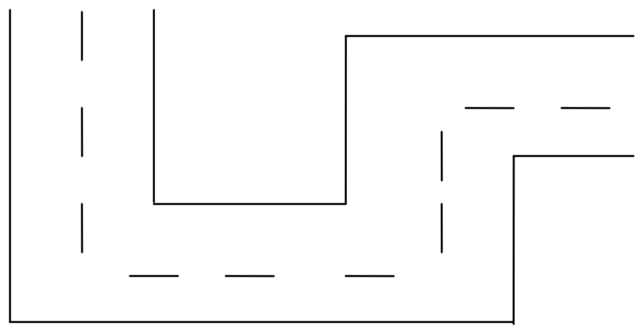
Tic-Tac-Toe "Rational Expressions"

Name: ________________________ **Date:** ____________________

$\dfrac{15a^2}{25a^4}$ **A**	$\dfrac{12n^4}{21n^6}$ **S**	$\dfrac{x^2-2x}{x}$ **I**
$\dfrac{a^3-2a^2}{2a^2-4a}$ **N**	$\dfrac{x^2+3x}{3x+9}$ **R**	$\dfrac{2x^2-5x+3}{x^2-1}$ **A**
$\dfrac{10+3x-x^2}{x^2-4x-5}$ **T**	$\dfrac{x^2+2x-15}{x^2-7x+12}$ **O**	$\dfrac{x^2+3x-10}{25-x^2}$ **L**

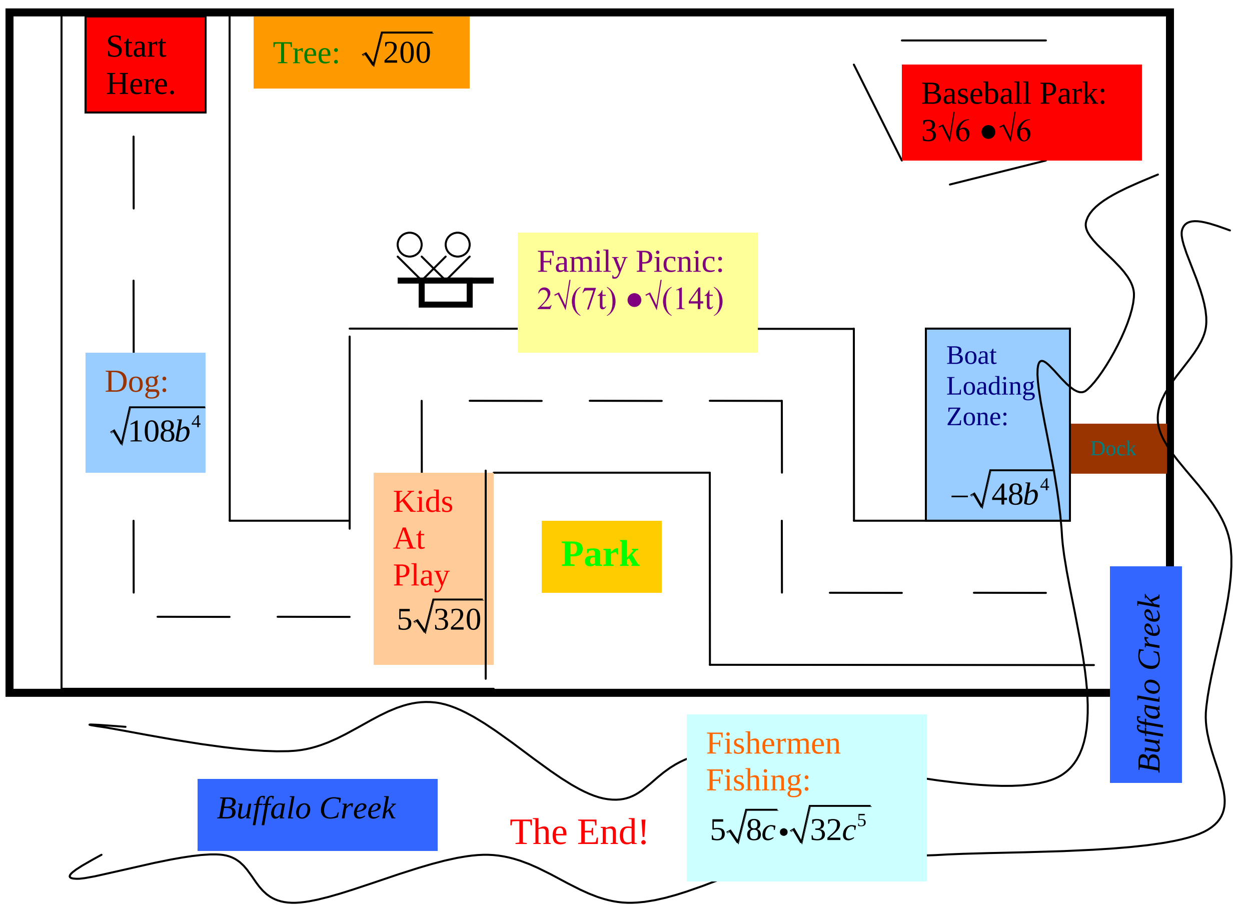
When you have “simplified” each expression, unscramble the letters to find out ***what kind***.

____



Follow the Rocky Radical Road…

At each roadside obstacle or event, solve the problems. First one down the road wins a prize.



Day 64 *Warm-Up – Cryptic Quiz (Reviews factoring.)* *Algebra With Pizzaz.*

Essential Question: How do I simplify radicals involving "quotients" – guess that involves what operation? "Division!"

Objective(s): 1.01 Write equivalent forms of algebraic expressions to solve problems.
a) Apply the laws of exponents.

"SAP": Mini-Quiz; Note-taking.

Lesson Anatomy: Check homework and warm-up.

Ask students to turn to a classmate and create a radical fact to share with your classmate. For example: My friend is $\sqrt{\frac{100}{4}}$ years old. How old is she? My shoe size is $\sqrt{\frac{256}{4}}$. Share with students that we can use the "division property" of square roots to simplify expressions. The key concept is that when the denominator of the radicand is a perfect square, it is easier to simplify the numerator and denominator separately. Look at the following example:

$\sqrt{\frac{11}{49}} = \frac{\sqrt{11}}{\sqrt{49}} = \frac{\sqrt{11}}{7}$ $\qquad$ $\sqrt{\frac{25}{b^4}} = \frac{\sqrt{25}}{\sqrt{b^4}} = \frac{5}{b^2}$

Simplify the following: $\sqrt{\frac{144}{9}} =$ $\qquad$ $\sqrt{\frac{25p^3}{q^2}} =$

$\sqrt{\frac{75}{16t^2}} =$ $\qquad$ $\sqrt{\frac{13}{64}} =$ $\qquad$ $\sqrt{\frac{49}{x^4}} =$

The next way to simplify radicals by "dividing, is just that!!!

Look at the following: $\sqrt{\frac{88}{11}} = \sqrt{8} = \sqrt{(4 \bullet 2)} = \sqrt{4} \bullet \sqrt{2} = \underline{2\sqrt{2}}$

$\sqrt{\frac{12a^3}{27a}} =$ $\qquad$ $\sqrt{\frac{90}{5}} =$ $\qquad$ $\sqrt{\frac{27x^3}{3x}} =$

$\sqrt{\frac{129}{10}} =$ $\qquad$ $\sqrt{\frac{75x^5}{48x}} =$

Lastly, explain that one of the most common ways to simplify a radical expression that is NOT a perfect square is to "*rationalize the denominator*". The key here is to multiply the numerator and the denominator by the same radical expression to make the denominator a perfect square!

Examine the following: $\frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \bullet \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{\sqrt{25}} = \frac{2\sqrt{5}}{5}$ **!**

$\frac{\sqrt{7}}{\sqrt{8n}} = \frac{\sqrt{7}}{\sqrt{8n}} \bullet \frac{\sqrt{2n}}{\sqrt{2n}} = \frac{\sqrt{14n}}{16n^2} = \frac{\sqrt{14n}}{4n}$ **!**

You Try!

1. $\frac{3}{\sqrt{3}} =$

2. $\frac{\sqrt{5}}{\sqrt{18t}} =$

3. $\sqrt{\frac{7m}{10}} =$

4. $\frac{3}{\sqrt{7}} =$

5. $\frac{\sqrt{11}}{\sqrt{12x^3}} =$

Summarize by highlighting the key concepts. Have students draw the following:

A "radical expression" is in simplest form when all three statements are true.

- **The radicand has no perfect-square factors other than 1.**
- **The radicand has no fractions.**
- **The denominator of a fraction has no radical.**

<u>Summarizing Activity:</u> Mini-Quiz: 1. $\sqrt{16} \bullet \sqrt{8} =$

2. $4\sqrt{144} =$

3. $\sqrt{\frac{12}{36}} =$

4. $\frac{2}{\sqrt{a^5}} =$

5. $\frac{\sqrt{3x}}{\sqrt{15x^3}} =$

Work with a partner to simplify and share explanations based on the key summary.

<u>Homework:</u> Practice 11-1 "COLUMN 3 – down" only. #3, 8, 13, etc.

Algebra I Lesson Plans for Block Schedule

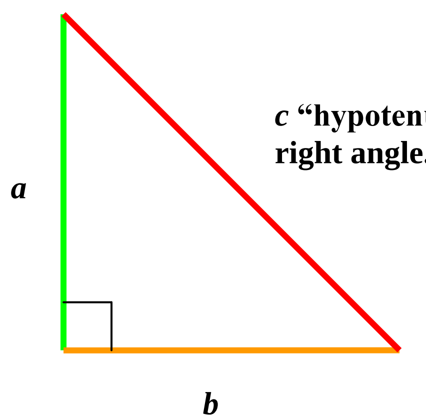
Day 65 *Warm-Up "Question & Answers" Mini-Review (See attached).*

Essential Question: **How do I solve problems using the** Pythagorean Theorem**, identify** right **triangles, and calculate** "heights" **indirectly?**

Objective(s): 1.02 Use formulas and algebraic expressions to solve problems.
2.02 Use the parallelism or perpendicularity of lines and segments to solve problems.

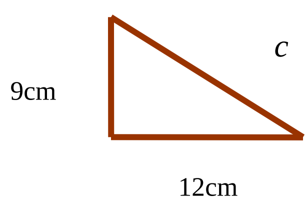
"SAP": Pass out rulers and construction paper for students to draw "right" triangles.

Lesson Anatomy: Check homework and warm-up. Lead into lesson by completing the "Check Skills You'll Need". Share that Pythagoras was a Greek philosopher and mathematician who developed the theorem that in any *right* triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse. Look at the diagram below:



The theorem states: $a^2 + b^2 = c^2$. **Therefore, look at the following example.**

If $a^2 + b^2 = c^2$**, then**



$9^2 + 12^2 = c^2$

81 + 144 = c^2

225 = c^2 $\therefore$ Remember, taking the square root undoes squaring.

$c = \sqrt{225}$ = 15cm

Let's look at this real -life situation. A fire truck is parked beside a building such that the base of the ladder is 16 feet from the building. The fire truck extends its ladder 30 feet towards the building to the left. How high is the top of the ladder above the ground?

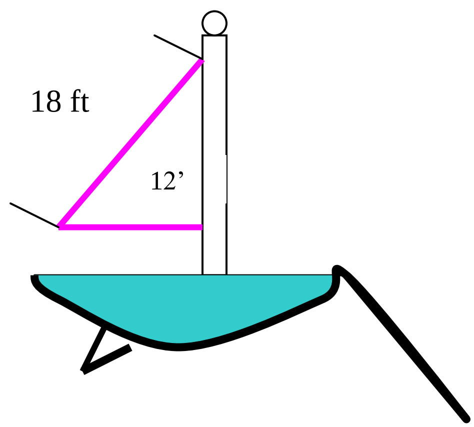
Let *b* = height of the ladder from a point 10 feet above the ground.

$$a^2 + b^2 = c^2 \;\therefore\; \begin{aligned} 16^2 + b^2 &= 30^2 \\ 256 + b^2 &= 900 \\ b^2 &= 900 - 256 \\ b^2 &= 644 \end{aligned}$$

$$\boldsymbol{b^2 = \sqrt{644} \approx 25.4 \textit{ feet}}$$

Continue with the Check Understanding example at the bottom of pg. 585. Solve together.

Students will then take their construction paper and create a sailboat diagram with the following measurements.



What is the height of the sail in simplest radical form? What is the area of the sail to the nearest tenth?

Lastly, review simplifying radicals by playing MATHO – Radicals. Partner students to play.

<u>Summarizing Activity:</u> MATHO-Radicals

<u>Homework:</u> Practice 11-1 #39, 44, 49, 54, 59, 64. (Put on a separate sheet of paper).

M	A	T	H	O

		®		

1. $10\sqrt{2}$

2. $7\sqrt{2}$

3. $5\sqrt{3}$

4. $-4\sqrt{5}$

5. $-6\sqrt{30}$

6. $40\sqrt{5}$

7. $2n\sqrt{7}$

8. $6b^2\sqrt{3}$

9. $6x\sqrt{3}$

10. $2n\sqrt{n}$

11. $2a^2\sqrt{5a}$

12. $-4b^2\sqrt{3}$

13. **20**

14. **18**

15. $11\sqrt{2}$

16. $84\sqrt{3}$

17. $7\sqrt{3}$

18. $-30\sqrt{3}$

19. $6n\sqrt{2}$

20. $14t\sqrt{2}$

21. $\frac{\sqrt{21}}{7}$

22. $\frac{5}{2}$

23. $\frac{2\sqrt{30}}{11}$

24. $\frac{\sqrt{5}}{3a}$

25. $\frac{2n\sqrt{2n}}{9}$

26. $\frac{3}{2}$

27. $2\sqrt{3}$

28. $2x\sqrt{7}$

29. $2\sqrt{3}$

30. $\frac{\sqrt{2b}}{b}$

MATHO – Radicals

1. $\sqrt{200}$

2. $\sqrt{98}$

3. $\sqrt{75}$

4. - $\sqrt{80}$

5. $-3\sqrt{20}$
6. $5\sqrt{320}$

7. $\sqrt{28n^2}$

8. $\sqrt{108b^4}$
9. $3\sqrt{12x^2}$

10. $\sqrt{4n^3}$

11. $\sqrt{20a^5}$

12. $-\sqrt{48b^4}$

13. √10 ●√40

14. 3√6 ●√6

15. √22 ●√11

16. 2√18 ●7√6

17. (√7)(√21)

18. -3√20 ● √15

19. √(3n) ●√(24n)

20. 2√(7t) ●√(14t)

21. $\sqrt{\frac{21}{49}}$

22. $\sqrt{\frac{625}{100}}$

23. $\sqrt{\dfrac{120}{121}}$

24. $\sqrt{\dfrac{5}{9a^2}}$

25. $\sqrt{\dfrac{8n^3}{81}}$

26. $\sqrt{\dfrac{54}{24}}$

27. $\sqrt{\dfrac{60}{5}}$

28. $\sqrt{\dfrac{140x^3}{5x}}$

29. $\dfrac{12}{\sqrt{12}}$

30. $\dfrac{3\sqrt{2}}{\sqrt{9b}}$

Algebra I Lesson Plans for Block Schedule

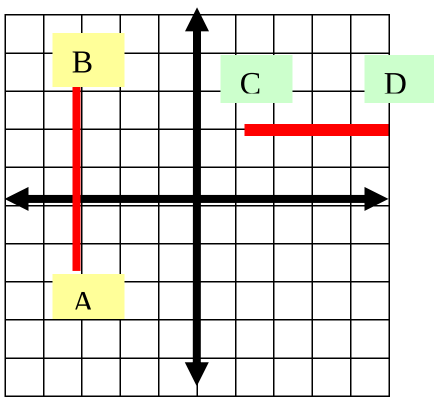
Day 66 *Warm-Up "What Do You Call an Alligator That Sneaks Up and Bites You from Behind? (Reviews "factoring")* *Algebra With Pizzaz.*

<u>Essential Question:</u> How can I apply the Pythagorean Theorem to finding the distance between two points on a coordinate plane and finding the coordinates of the "*midpoint*" of a line segment?

<u>Objective(s):</u> 1.02 Use formulas and algebraic expressions, including iterative and recursive forms, to model and solve problems.
2.01 Find the lengths and midpoints of segments to solve problems.

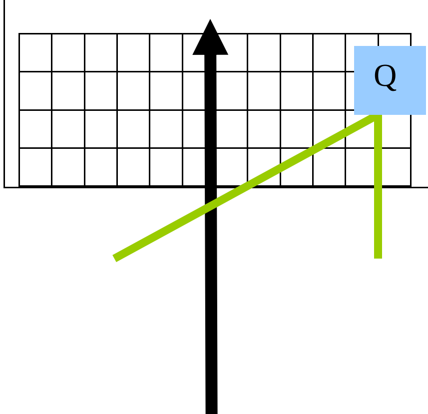
<u>"SAP":</u> Students will work with grid paper to create a graphing "formula" booklet.

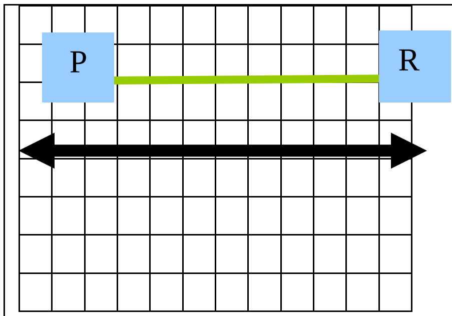
<u>Lesson Anatomy</u>: Check warm-up and homework. Explain to the students that an application of the Pythagorean Theorem can be found in finding the distance between two points on a coordinate plane. Pass out grid paper and have students duplicate the following diagram.



In the diagram above, $\overline{CD}$ is a horizontal line segment. Point C is located at (1, 2) and point D is found at (5, 2). You can find the length of the line by subtracting the "x" coordinates (5 – 1 = 4) units long. Similarly, point B is located at (-3, 3) and point is at (-3, -2). However, here you can find the vertical length by subtracting the "y" coordinates: (3 – (-2) = 5 units).

Look at the picture below and identify the coordinates of each point in the *right* triangle.





Point "P" is found at (-3, 2), point "Q" at (5, 6), and point "R" (5, 2).

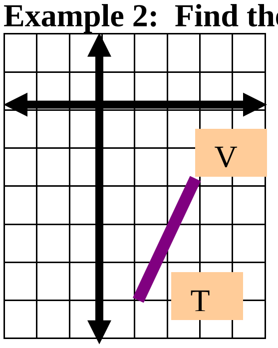
For any two points P ($x_{1,}y_1$), and Q ($x_{2,}y_2$) not on a vertical or horizontal line, you can graph the points to form a right triangle and apply the Pythagorean Theorem to find the distance between the points.

$$(PQ)^2 = (PR)^2 + (RQ)^2$$
$$(PQ)^2 = (x_2 - x_1) + (y_2 - y_1)$$
$$\sqrt{(PQ)^2} = \sqrt{(x_2 - x_1) + (y_2 - y_1)}$$

Substitute the appropriate numerical values.

$$\sqrt{(PQ)^2} = \sqrt{(5-(-3))^2 + (6-2)^2}$$
$$= \sqrt{8^2 + 4^2}$$
$$= \sqrt{80}$$
$\approx$ **8.9 units**

Example 2: Find the distance between *T* (1, -5) and *V* (3, -2).



Point T is located at (1, -5) and point V is at (3, -2).

d **=** $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(3-1)^2 + (-2-(-5))^2}$

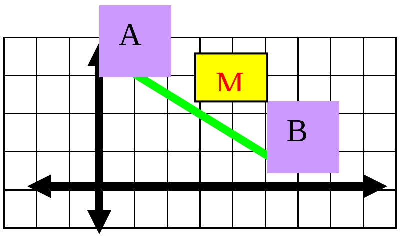
$= \sqrt{(2)^2 + (3)^2}$

$= \sqrt{13}$

$\approx$ **3.6 units**

OK, so now that we can find the length of a diagonal line, how can we find the "midpoint" of a line segment?

Have students create the following on a grid.



To divide a line into 2 equal segments→ $\overline{AM} = \overline{MB}$**, you apply the midpoint formula:**

$$M = \left(\frac{(x_1 + x_2)}{2}, \frac{(y_1 + y_2)}{2}\right)$$

$$= \left(\frac{(5+1)}{2}, \frac{(1+3)}{2}\right)$$

$$= (3, 2)$$

Time permitting, work through examples 3 and 4 with additional examples.

<u>Summarizing Activity:</u> "Ticket-Out-The-Door" – Students will respond to the question: "*What is the **distance** formula and why is it important?" "What is the **midpoint** formula, and why is it important?"*

<u>Homework:</u> Textbook pg. 594 #15, 17, 18.

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 67 *Warm-Up "What Do You Call a Duck That Steals?" (Reviews slope.)*
<u>Algebra With Pizzaz.</u>

<u>Essential Question:</u> How do I simplify *sums and differences*; *products and quotients* **when manipulating the four operations?**

<u>Objective(s):</u> 1.01 Write equivalent forms of algebraic expressions to solve problems.

<u>"SAP":</u> Partner Activity – "Boo -Hoo! What's Wrong?"

<u>Lesson Anatomy</u>: Check warm-up and homework.

Ask students to recall the fact: 3x + 12x = 15x. Remind students that we can manipulate the numbers (add them) because they shared the same variable, "x".

Share that the same holds true for radicals. $8\sqrt{10}-2\sqrt{10}=6\sqrt{10}$ **. Ask students to predict why the answer is true. (They share the same radicand!)**

Therefore, $\sqrt{2}+3\sqrt{2}=4\sqrt{2}$ **→Prompt students to recall that a "1" exists in front of the radical sign, just like a variable, and not to forget to consider it in the "operation".**

$-3\sqrt{5}-4\sqrt{5}=$ ______________ $\sqrt{13}-5\sqrt{13}=$ ______________________

What about the following? $7\sqrt{3}-\sqrt{12}$ **= ? What is the problem here? Lead students to conclude that** $\sqrt{12}$ **is NOT in simplest form.**

$$\therefore\ 7\sqrt{3}-\sqrt{12}=7\sqrt{3}-\sqrt{4}\bullet\sqrt{3}$$
$$=7\sqrt{3}-2\sqrt{3}$$
$$=5\sqrt{3}$$

$$3\sqrt{20}+2\sqrt{5}=3\sqrt{4}\bullet\sqrt{5}+2\sqrt{5}$$
$$=\mathbf{3(2)}\sqrt{5}+2\sqrt{5}$$
$$=6\sqrt{5}+2\sqrt{5}$$
$$=8\sqrt{5}$$

What about this one? You try! $3\sqrt{3}-2\sqrt{27}=$

…and this one: $8\sqrt{5}-\sqrt{45}=$ **…and** $3\sqrt{7}-2\sqrt{28}=$

Simplify: $8\sqrt{3}-2\sqrt{2}+3\sqrt{2}+5\sqrt{3}=$ ____________________________________.

So…what about the operation of "*multiplication*"? Look at the examples below. What "property" needs to be applied? <u>**Distributive!!**</u>

$$\sqrt{3}(\sqrt{6}+\sqrt{7}) = \sqrt{18}+7\sqrt{3}$$
$$= \sqrt{9}\bullet\sqrt{2}+7\sqrt{3}$$
$$= 3\sqrt{2}+7\sqrt{3}$$

Look at: $\sqrt{2x}(\sqrt{6x}-11)=\sqrt{12x^2}-11\sqrt{2x}$

$$= x\sqrt{4}\bullet\sqrt{3}-11\sqrt{2}$$
$$= 2x\sqrt{3}-11\sqrt{2x}$$

Can you solve?

$\sqrt{5}(2+\sqrt{10})=$ **and** $\sqrt{5a}(\sqrt{5a}+3)=$

Work through example 4 and 5 with additional examples.

Try these *without* my help…you won't need it, right?!

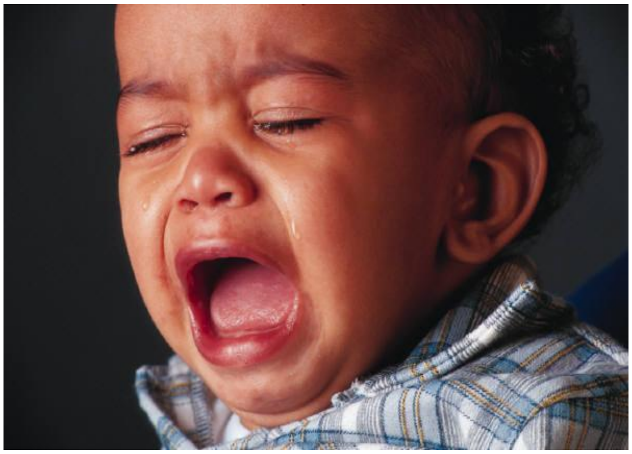
$\sqrt{5}(\sqrt{8}+9)=$

$\sqrt{6}-3\sqrt{21}\quad\sqrt{6}+\sqrt{21}\quad=$

Partner students up for "Boo-Hoo – What's Wrong?" (See attached).

<u>**Summarizing Activity:**</u> **3-2-1 – List 3 ways to simplify a radical expression that involves multiplication. From pg. 603 in your textbook, solve the following 2 problems: #13 and #15. What is a conjugate and give 1 example?**

<u>**Homework:**</u> **Grab & Go File – Re-teach #1-12.**

 ***"Boo-Hoo! What's Wrong?***

Partners: ___________________________ Date: __________

Can I simplify the following to "like" radicals?

$\sqrt{3}, \sqrt{75}$ **NO!**

$\sqrt{5}, \sqrt{50}$ **YES!**

What's wrong with these answers or is there even a problem?

$\sqrt{8} + 2\sqrt{2} = 6\sqrt{2}$

$4\sqrt{5} - 2\sqrt{45} = -2\sqrt{5}$

$-4\sqrt{10} + 6\sqrt{40} = 10\sqrt{8}$

$\sqrt{3}(\sqrt{27} + 1) = 3 + \sqrt{3}$

$(3\sqrt{2} + \sqrt{3})(\sqrt{2} - 5\sqrt{3}) = 9 - 14\sqrt{6}$

Algebra I Lesson Plans for Block Schedule

Day 68 *Warm-Up "Do Elephants Know How to Gamble?" (Reviews simplifying square roots.)* *Algebra With Pizzaz.*

Essential Question: How can I do well on my totally "radical" quiz? I've heard of linear and exponential functions, but what are "*quadratic*" functions?

Objective(s): 4.02 Graph, factor, and evaluate quadratic functions to solve problems.

"SAP": The students will take a "radical" test and complete an acceleration graphic organizer to introduce Chapter 10-Quadratic Equations and Functions.

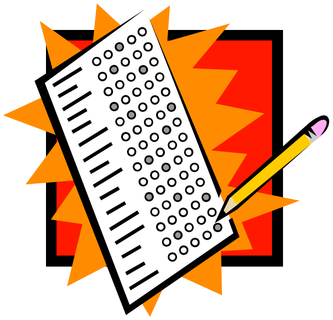
Lesson Anatomy: Check warm-up and homework.

Radical Quiz – 35-40 minutes. See attached.

Introduce Chapter 10 by walking through the following *acceleration* graphic organizer. See attached.

Summarizing Activity: Investigation → "Plotting Quadratic Curves" (See TE pg. 510.

Homework: EOC Test Prep Book – pg. 34



Totally "***Radical***" Test

Name: ________________ **Date: __________**

Simplify each expression. Work your problems out in the right-hand section of each page.

1. $\sqrt{20}$ **=**

2. $2\sqrt{5} \bullet \sqrt{5} =$

3. $\dfrac{\sqrt{42x^2}}{\sqrt{6y^3}}$ **=**

4. $8\sqrt{6} + 3\sqrt{6}$ **=**

5. $10\sqrt{17} + 9\sqrt{7} - 8\sqrt{17} + 6\sqrt{7}$ **=**

6. $3\sqrt{7} - 2\sqrt{28}$ **=**

7. $2\sqrt{20} - 3\sqrt{24} - \sqrt{180} =$

8. $\sqrt{5}(2\sqrt{10} + 3\sqrt{2})$ **=**

9. $8\sqrt{54} - 4\sqrt{6} =$

10. $(\sqrt{6} + \sqrt{8})(\sqrt{24} + \sqrt{2}) =$

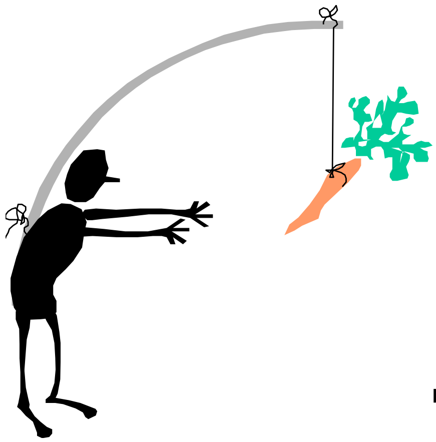
11. $2\sqrt{32} + 3\sqrt{50} - 3\sqrt{18} =$

12. $(5\sqrt{2} + 3\sqrt{5})(2\sqrt{10} - 3) =$

13. $\dfrac{2}{\sqrt{3} - 5} =$

14. $\dfrac{\sqrt{6}}{7 - 2\sqrt{3}} =$

15. $3\sqrt{75} - \sqrt{243} =$



The Final Chapter

Unit Plan for Graphing Quadratic *Functions* and Solving Quadratic *Equations*

Unit Essential Question

How do I graph quadratic functions and relate the graphs to the solution of quadratic equations.

Vocabulary

Parabola **Axis of Symmetry**

Vertex **Minimum**

Maximum **Roots** **x-intercept(s)**

Essential Questions

- **What is the standard form of a quadratic function? What does the "a", "b", and "c" tell us in the $y = ax^2 + bx + c$?**
- **What do the graphs look like $y = ax^2$?**
- **What is the axis of symmetry? Vertex? Minimum/maximum values?**
- **How do I "graph" $y = ax^2 + bx + c$?**
- **How do I solve *quadratic* equations? By factoring and the quadratic formula?**

Algebra I Lesson Plans for Block Schedule

Day 69 *Warm-Up – "Cryptic Quiz" (Reviews simplifying rational expressions) Algebra With Pizzaz.*

Essential Question: How do I graph quadratic functions of the forms $y = ax^2$ and $y = ax^2 + c$?

Objective(s): 4.02 Graph, factor, and evaluate quadratic functions to solve problems.

"SAP": The students will complete a graphic organizer to consolidate key concepts from the lesson and graph quadratic functions on the calculator and from a table.

Lesson Anatomy: Check warm-up.

Pass back radical quizzes and clarify any questions. Ask students to refer to their Quadratic Curves Investigation from the previous day. Review key observations from the graphing activity. Remind students that the graph of a quadratic function is a U-shaped curve called a "*parabola*".

Have students graph $y = 2x^2$ on their calculators. Ask students if they see that the two sides of the parabola match exactly. That is, if they were to fold the graph vertically, the arms would match up. Explain that the fold-line divides the parabola into two equal halves and that the line is called the "*axis of symmetry*". Share that the highest or lowest point of a parabola is called the VERTEX and it always lies on the "axis of symmetry".

Make a transparency of example 1 a) and b) TE pg. 511. Ask students to identify what the vertex point is, and whether it's a *minimum* or *maximum*. Repeat for Check Understanding 1 a) and b). Then, ask students to graph on their calculators:

$y = x^2$, $y = 4x^2$, *and* $y = \frac{1}{2}x^2$. What do they observe as to the location of the vertex? What do they observe about the width of the parabola? Lead them to conclude that ALL quadratic functions in the form $y = ax^2$ will have the vertex located at the origin. Next, pass out graph paper and rulers. Have the students graph $y = -2x^2$ by making a table. Demonstrate the table and how to choose the best input values of "x". Repeat by making a table of values and graphing: $y = \frac{1}{3}x^2$. Extract from the students that from their observations, the value of "a", the coefficient of the x^2 term in a quadratic function, affects the width of a parabola as well as the direction in which it opens.

Next, have students graph on their calculators: $f(x) = -x^2$; $f(x) = -3x^2$; $f(x) = \frac{1}{4}x^2$.

Compare these graphs to the first three graphed in the lesson. Complete the following graphic organizer, below.

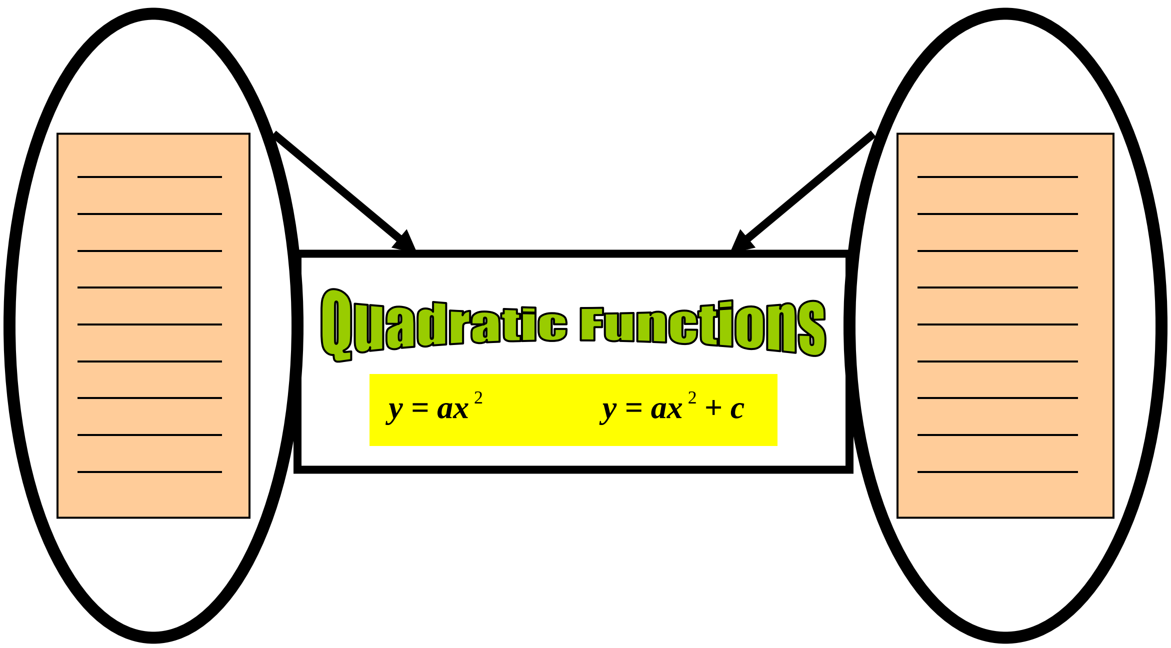
Lastly, graph $y = 2x^2$ **and** $y = 2x^2 + 3$ **from a table of values.**

x	$y = 2x^2$	$y = 2x^2 + 3$
-2		
-1		
0		
-1		
-2		

Ask, are the shapes the same? What's different?

Repeat for $y = x^2$ **and** $y = x^2$. **Draw conclusions.**

<u>Complete the following "graphic organizer".</u>



<u>Summarizing Activity:</u> Ticket-Out-The-Door – ***Question 40-43-Textbook, pg. 515.***

<u>Homework:</u> Textbook – pg. 514 # 27-33.

Day 70 *Warm-Up- EOC Review. (See attached questions.)*

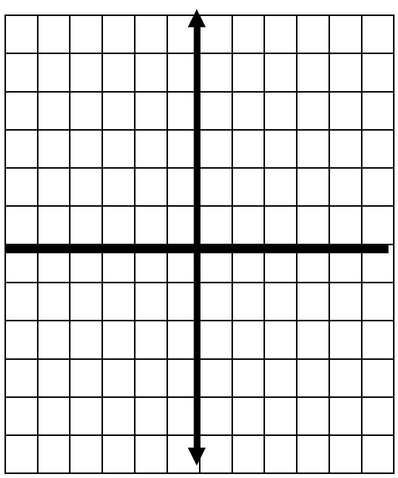
Essential Question: **How do I graph quadratic functions of the form:**
y = ax ^{2} ***+ bx + c?***

Objective(s): 4.02 Graph, factor, and evaluate "quadratic" functions to solve problems.

"SAP": **The students will be exploring graphing quadratic functions. They will be making predictions, observations, and graphing to find specific pieces of information. They will complete a "*Quadratic Activity"* with a partner.**

Lesson Anatomy: Check homework and warm-up.

Have students look at the graphs of $y = x^2$; $y = -x^2 + 2$; and $y = \frac{1}{2}x^2 - 1$. **With 3 different colored pencils, sketch each of the graphs on the grid below.**

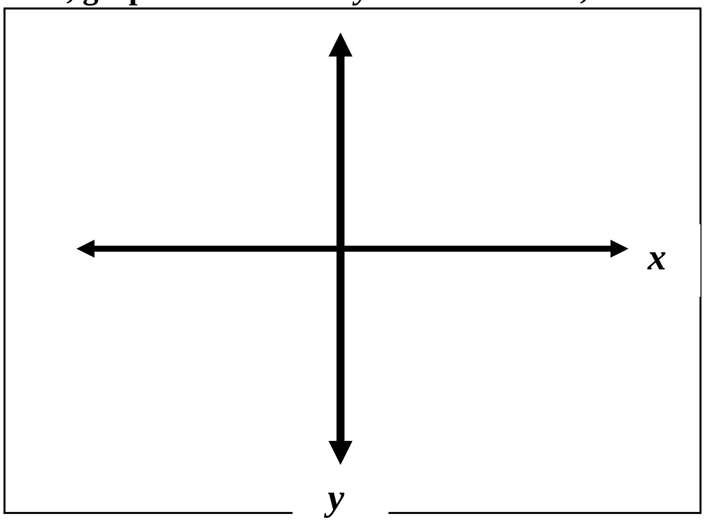


Notice that the constant "c" in the quadratic function shifts the parabola up or down. Today, we want to examine how the graph changes when the "b" variable changes. Can you make any predictions? (Share as a class.)

Ask the class to graph: $y = 2x^2 + 2x$, $y = 2x^2 + 4x$, *and* $y = 2x^2 + 6x$ **on 3 separate grids. What has changed in each equation? The value of "b". Ask what else they notice that is common to all 3 graphs? (Same "y"- intercept!) Share that the reason for this is that "c" = 0. What has changed is the location of the "axis of symmetry". The equation for the "axis of symmetry" is related to the ratio** $\frac{b}{a}$. **Look at the first equation -** $\frac{b}{a} = \frac{2}{2} = 1$ **and the "axis of symmetry" is x =** $-\frac{1}{2}$. **In equation 2, the ratio**

is $\frac{b}{a} = \frac{4}{2} = 2$ **and the "axis of symmetry" is x = -1 (or -$\frac{2}{2}$). In equation 3, the ratio is** $\frac{b}{a} = \frac{6}{2} = 3$ **and the "axis of symmetry" is x = -$\frac{3}{2}$. Therefore, the *equation* for the "axis of symmetry" is** $\frac{-1}{2}(\frac{b}{a}) or \frac{-b}{2a}$**. This also means the x-coordinate of the vertex is** $\frac{-b}{2a}$**.**

Next, graph the function: $y = -3x^2 + 6x + 5$**, below.**



What is the equation of the "axis of symmetry"? ______________________________

So, if the "x" coordinate of the vertex is *(1,?)*, how do you find the "y" value?

The vertex is then (___,___).

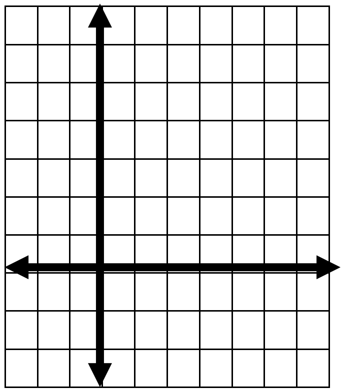
To find another point on the graph, you can use the "y" intercept. Where x = 0, another point is therefore, (0, 5).

Choose a value for "x" on the same side of the vertex as the y-intercept. If x = -1, plug it into the equation to find that y = -4. So, another point is (-1, -4).
Now you can plot (0,5) and (-1, -4) and then "*reflect*" them across the "axis of symmetry" to draw the parabola.

Your Turn

Work with a partner to complete the following *quadratic function activity*.

Graph: $f(x) = x^2 - 6x + 9$**, below.**



Find the following:

Vertex ____

y-intercept ____

x-intercept(s) ____

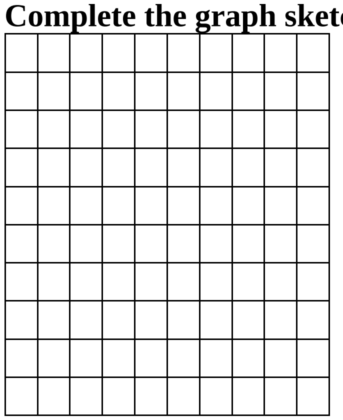
Does the graph have a *maximum* **or** *minimum***? What is it?** ___________

Why? ____________________________

What is the equation for its "axis of symmetry"? ___________________

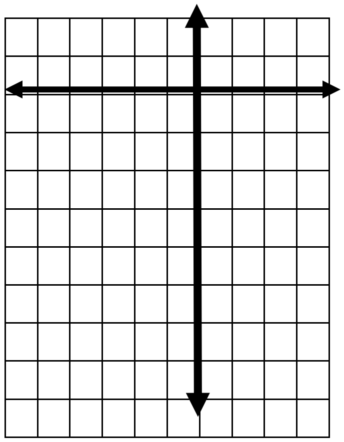
At what 2 points (grid junction) does the parabola cross, exactly? ______________

Complete the graph sketch.



On My Own

Repeat the above for the function: $y = 2x^2 + 4x - 3$



Summarizing Activity: **Complete the following organizer.**

Graphing Quadratic Equations

$y = ax^2 + bx + c$

What does "a" tell us?

What does "b" tell us?

What does "c" tell us?

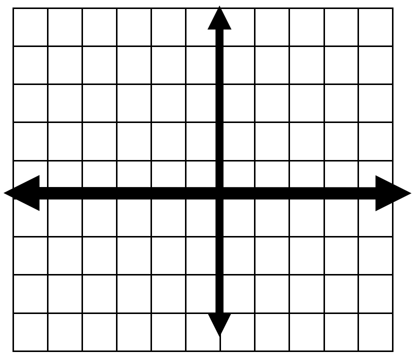
Homework: **Textbook. Pg. 520, # 11-14**

<u>EOC Review Warm-Up</u>

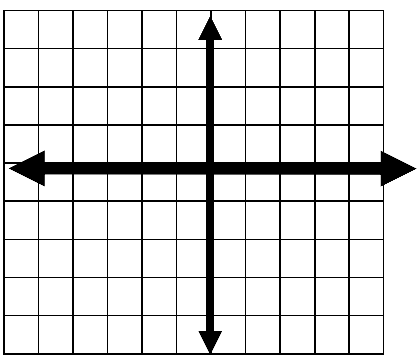
<u>Name:</u> ___________________________________ Date: ______________

Graph the following inequalities.

$4x - 3y > 9$

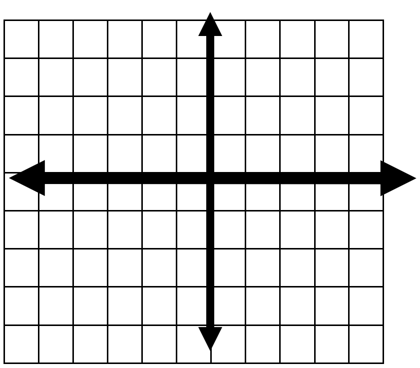


$x + 2y \geq 4$



Solve the following system by graphing.

$x + 2y < 4$
$3x - y > 6$



Algebra I Lesson Plans for Block Schedule

Day 71 *Warm-Up "What Is the Title of This Picture?" (Reviews Pythagorean Theorem)* *Algebra With Pizzaz.*

Essential Question: How can I continue to learn about the characteristics of "quadratic" functions and how can I apply it to the formula: $h = -16t^2 + c$? What is this formula, anyhow, and how is it used?

Objective(s): 4.02 Graph, factor, and evaluate quadratic functions to solve problems.

"SAP": The students will complete graphs and solve problems involving the above formula to make application of the quadratic function.

Lesson Anatomy: Check homework and warm-up.

Share with the students a picture of the "Gateway Arch" in St. Louis, Missouri, and tell them it is called a *"catenary"* **(a U-shaped curve that resembles a parabola). Explain that there is a formula, $y = \frac{-2}{315}x^2 + \frac{91}{21}x - \frac{880}{7}$, where "x" represents width in feet and "y" represents height in feet, that models the outer edge of the arch. Graph on the calculator. Have students investigate key points on the graph → the x-intercept(s), vertex, y-intercept, and the maximum value. Share with students that if they were sitting in an engineering meeting and were asked how wide the arch was at 560 feet, we could find this by tracing the graph.**

We could also find this out "*algebraically*", by setting up the equation:

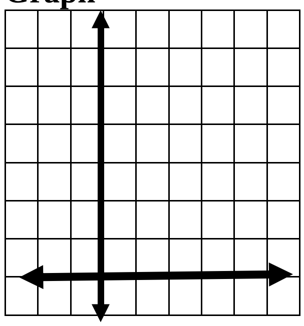
$y = \frac{-2}{315}x^2 + \frac{92}{21}x - \frac{880}{7} = 560$. We could also find the "x-intercepts" of the graph by tracing on the calculator or y solving the equation by setting it equal to 0! Why 0? Discuss the difference between the roots of the equation and the "x-intercepts" of the graph of the related function. Demonstrate and have students manipulate their calculators. Isn't this cool!!!

Ask how many students have seen an eagle flying over a canyon? Let's say the eagle is 30 feet above the level of the canyon's edge when it drops a stick from its claws. What acts on the stick? (gravity) This force causes the stick the stick to fall toward Earth. The function, $h = -16t^2 + 30$ gives the height of the stick *(h)* in feet after *(t)* seconds. Have the students graph this quadratic function.

Make a table:

't'	$h=-16t^2+30$
0	**30**
1	14
2	**-34**
3	**?**

Graph



The "y" axis represents (height) and the "x" represents (time).

Suppose a squirrel is in a tree 24 feet above the ground. She drops an acorn – oops! The function $h=-16t^2+24$ **gives the height of the acorn in feet after "t" seconds. What does this function look like? Why is "x" nonnegative? (TIME)**

The formula $h=-16t^2+c$ **describes the height above the ground of an object falling from an initial height *c*, at time *t*. If an object is given an initial upward velocity "*v*" and continues with no additional force of its own, the formula** $h=-16t^2+vt+c$ **describes its approximate height above the ground.**

Work through example #2 on pg. 519.
Continue to work through question # 15 and 16 – pg. 520.

<u>Summarizing Activity:</u> 3-2-1. Have students partner up to ask the following questions: a) What do you know about the upward/downward shape of the parabola? b) What is the vertex and equation for the "axis of symmetry"? c) The "axis of symmetry" affects which letter in the equation formula?

<u>Homework:</u> Pass out graphs of Lesson Quiz # 1 and 2. State what the "axis of symmetry" is and the vertex!

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 72 *Warm-Up- "A Drastic Way to Diet. (Reviews factoring trinomials.)* *Algebra With Pizzaz.*

Essential Question: **How do I solve a *"quadratic"* equation by graphing? What does the answer look like?**

Objective(s): 4.02 Graph, factor, and evaluate quadratic functions to solve problems.

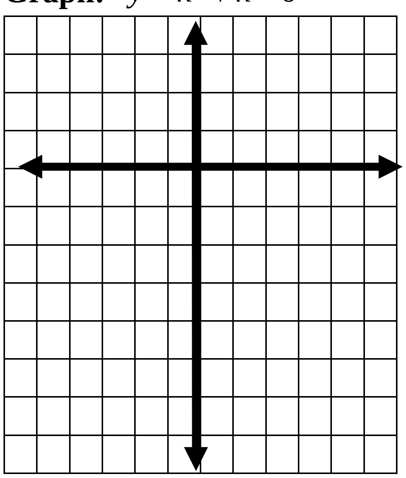
"SAP": Complete mini-graphing booklet.

Lesson Anatomy: Check homework and warm-up. Share with students that the next few days will be spent on solving "quadratic" equations, and that like solving "systems" of equations, there is more than one way. Today, our purpose is to learn how to solve a quadratic equation by graphing.

Pass out 3 large index cards to each student, several mini-grids, rulers, and colored markers. On the front of the first card, place the heading "Investigation – Finding the "X" Intercept(s)", and their name.

Cut and paste two grids on the front. Graph: $y = 2x - 3$ on one grid, and then on their calculators, graph $y = x^2 + 3x - 4$, and sketch the "pictorial" result on the 2nd graph. With a colored pencil, mark where each graph crosses the "x" axis.
Ask students to solve: 2x – 3 = 0. What do you notice about the solution?

If you were to substitute the values of "x" into the quadratic function, do they both satisfy the equation?
Graph: $y = x^2 + x - 6$



What are the "x-intercepts"? Do the values satisfy the equation?

What conclusion can you draw? (The quadratic equation is = 0 and its

corresponding quadratic function is = *y*. The solutions of a quadratic equation and the "x-intercepts" of its related quadratic function are identical!)

The standard form of a quadratic equation is: $ax^2 + bx + c = 0$.

On 3 separate mini-grids, graph: $x^2 - 4 = 0$; $x^2 = 0$; **and** $x^2 + 4 = 0$.

What are your observations with regards to the "x-intercepts"?

Graph: $x^2 - 1 = 0$; $2x^2 + 4 = 0$; **and** $x^2 - 16 = 0$. **What conclusions can you draw?**

With a partner, solve each equation by graphing the related function. If the equation has no solution, write "no solution".

1) $2x^2 - 8 = 0$

b) $x^2 + 2 = -2$

<u>Summarizing Activity:</u> ***Point & Go*** **– <u>Repeat twice</u>. Share with a classmate three things you learned about solving a quadratic equation by graphing.**

1. ______________________ 2. _______________________ 3. __________________

<u>Homework:</u> Practice 10-4 – middle column only. #2, 5, etc.

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 73 *Warm-Up – "Line Design – Worksheet Two".*

<u>Essential Question:</u> **How do I solve a "quadratic" equation by *"factoring"*? Can it help me with dimensions, perimeter, and area problems?**

<u>Objective(s):</u> 4.02 Graph, factor, and evaluate quadratic functions to solve problems.

<u>"SAP":</u> **Note-taking!**

<u>Lesson Anatomy</u>: Check homework and warm-up.

Together, work through factoring the following expressions.

$2c^2+20c+14$ **(2c + 1)(c + 14)** $3p^2+32p+20$ **(3p + 2)(p + 10)**

$4x^2-21x-18$ **(4x + 3)(x – 6)**

From these examples, one can find the solutions, by factoring, to the quadratic functions given. This can be done by using the "Zero-Product Property".

Let's say a factored solution was (x + 5)(2x – 6). Set each of these factors = 0.

x + 5 = 0 **2x – 6 = 0** ***Check to see if each value of "x" satisfies the function.***

<u>x = -5</u> **2x = 6** **Substitute: (-5 + 5)(2(-5) – 6) = 0**

<u>x = 3</u> **(0)(-10-6) = 0**

(0)(-16) = 0 TRUE!

(3 + 5)(2(3) – 6) = 0

(8)(6 – 6) = 0

(8)(0) = 0 TRUE!

The solution is x = -5 and x = 3.

Look at this example:

(3y – 5)(y – 2) = 0 $\therefore$ **3y – 5 = 0** **AND** **y – 2 = 0**

3y = 5 **y = 2!**

y = $\frac{5}{3}$

Demonstrate how to check answers, then ask students to solve: (6k + 9)(4k – 11) = 0 Check answers. Follow up with one last example→ (2x + 3)(x – 4) = 0. Check.

Lead into the following examples. What if you were asked to factor the quadratic equation below?

$x^2-8x-48=0$ **Your answer would be:** $(x-12)(x+4)=0$

Therefore, *x – 12 = 0*   *AND*   *x + 4 = 0*
x = 12   ***x = -4***

Try: $x^2 + x - 12 = 0$ ***(x + 4)(x – 3)***   ***∴ x = -4, 3***

What about: $x^2 + x - 42 = 0$ ***(x + 7)(x – 6)***   ***∴ x= -7,6***

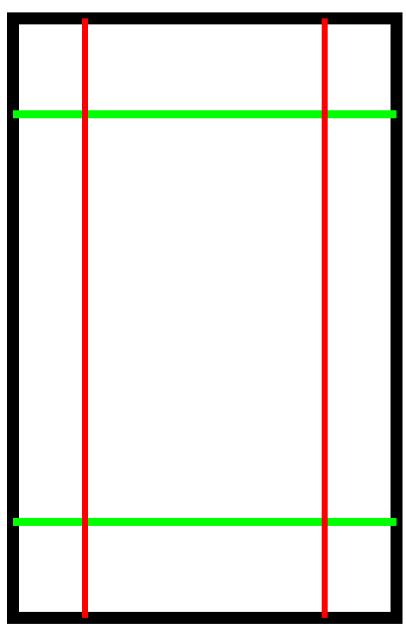
Lead the discussion to the fact that before solving a quadratic equation, you may need to *add* **or** *subtract* **terms in order to write the equation in standard form. Then, you can factor the expression. Look at the following:**

Solve by factoring.

$2x^2 - 5x = 88 \rightarrow 2x^2 - 5x - 88 = 0$ → ***factor*** → ***(2x + 11)(x – 8) = 0***   ***x = -5.5, 8***

You try: $3x^2 - 2x = 21$ $x = -\frac{7}{3}, 3$

Let's look at a real-world application example. Pass out ½ sheet of colored copy paper. Have the following diagram sketched on the paper:



Work through example 4 (TE pg. 537). Then, together work through "Additional Example" 4 from the wrap-around. Clarify any questions.

<u>Summarizing Activity:</u> ***"Air-Mail" Activity.*** **Divide class into 3 groups. Put the following 3 sets of 3 problems each on an index card and place the three cards in a white envelope. Together, each group is to solve the problems in their envelope, then, "air-mail" their problems to the next group. The first group to complete all the problems, correctly, wins a prize. The problem sets are as follows:**

<u>Set 1:</u> $(2x - 3)(x + 2) = 0$
$6 = a^2 - 5a$
$12x + 4 = -9x^2$

<u>Set 2:</u> $(7x + 2)(5x + 4) = 0$
$2c^2 - 7c = -5$
$4y^2 = 25$

<u>Set 3:</u> $(4a - 7)(3a + 8) = 0$
$28 = t^2 - 3t$
$5q^2 + 18q = 8$

<u>Homework:</u> **Practice 10-5 #35, 38, 40, 45, 46, 49.**

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 74 *Warm-Up – EOC Review – (See attached.)*

<u>Essential Question:</u> **How do I use the *"quadratic formula"* when solving quadratic equations? Which method of "solving" is best used, when?**

<u>Objective(s):</u> 1.02 Use formulas to model and solve problems.
4.02 Graph, factor, and evaluate quadratic functions to solve problems.

<u>"SAP":</u> The students will complete a graphic organizer to synthesize key "quadratic" ideas.

<u>Lesson Anatomy</u>: Check homework and warm-up.

Remind students that we have learned to solve quadratic equations by graphing and factoring. There are several other ways, but today, we are going to learn how to use the "Quadratic Formula". The rule states that if $ax^2+bx+c=0$**, and** *a ≠ 0,* **then**

***"x"* =** $\dfrac{-b \pm \sqrt{b^2-4ac}}{2a}$ **. Remind students that before using the formula, the quadratic equation must be in standard form. Look at the following example.**

$x^2+6=5x$ **Rearrange the terms so the function is equal to 0.**

$x^2-5x+6=0$ **Next, record what** *"a", "b", and "c"* **are equal to. In this example,**

a = 1; b = -5; c = 6. **Now, substitute the correct values into the formula.**

$$x = \frac{-(-5) \pm \sqrt{(-5)^2-4(1)(6)}}{2(1)}$$

$x = \dfrac{5 \pm \sqrt{1}}{2}$ **Therefore,** $x = \dfrac{5+1}{2}$ ***or*** $x = \dfrac{5-1}{2}$.

x = 3 *x = 2*

Check your answers to verify both are solutions.

Repeat for: a) $x^2-2x-8=0$ **4,-2** **b)** $x^2-4x=117$ **13, -9**

What if you have to "approximate" your solution? Look at this example to see what I mean!

$2x^2+4x-7=0$ ***a = 2, b = 4, c = -7*** ***Substitute into:***

$$\frac{-b\pm\sqrt{b^2-4ac}}{2a} = \frac{-4\pm\sqrt{(4)^2-4(2)(-7)}}{2(2)} = \frac{-4\pm\sqrt{72}}{4}$$

$$x = \frac{-4+\sqrt{72}}{4} \quad \textbf{\textit{or}} \quad \frac{-4-\sqrt{72}}{4}$$

$$x \approx \frac{-4+8.49}{4} \quad \textbf{\textit{or}} \quad \frac{-4-8.49}{4}$$

$$x \approx 1.12 \quad \textbf{\textit{or}} \quad x \approx -3.12$$

Try the following.

a) $3x^2+5x-2=0$ **0.67, 1** **b)** $7x^2-2x-8=0$ **1.22, -0.94**

Lastly, work through example 3 TE pg. 549 plus additional examples 1, 2, and 3 from the wrap-around. Conclude by passing out the following chart.

Method	**When to Use**
Graphing	**Best if you have a graphing calculator handy!**
Factoring	**Use if you can factor the question easily.**
Quadratic Formula	**Use if the equation cannot be factored easily or at all!**

Summarizing Activity: **Work with a partner to complete the following table.**

Which Way is the Best Way?

Quadratic Equation	***Which Method? Why?***
$5x^2+8x-14=0$	
$25x^2-169=0$	
$x^2-2x-3=0$	
$x^2-5x+3=0$	
$16x^2-96x+135=0$	

Homework: **Textbook – pg. 550 #5-10; 21-23.**


Getting Closer to EOC Time… "Practice Makes P-E-R-F-E-C-T!!! (*Yippee!)*

Name: ________________________ ***Date:*** _____________________

1. **What is the greatest common factor of the terms of the polynomial** $54d^4e^5 - 6d^5e^5 + 18de^3$ **?**

   ____

2. **Evaluate** $\frac{-2a-5b}{a+2b}$ **if *a* = 4 and *b* = -1.**

   ____

3. **Solve this quadratic equation by factoring:** $3w^2 - 8w - 3 = 0$

   ____

4. **What happens to the graph of** $y = x - 3$ **when it changes to** $y = 2x - 3$**?**

   ____.

5. **What is the solution of the following system of equations?**

   $3y = 4x - 21$

   $y = -x + \frac{7}{2}$ **(____, ____)**

Algebra I Lesson Plans for Block Schedule

Day 75 *Warm-Up – "Quadratic Criss-Cross" (See attached).*

Essential Question: How can I use the following activities to reinforce my knowledge and application of quadratic functions?

Objective(s): 4.02 Graph and evaluate quadratic functions to solve problems.

"SAP": The students will complete a "Quadratic Functions" activity with a partner and then take a mini-test.

Lesson Anatomy: Check homework and warm-up.

Share with students they can work with a partner to complete a variety of activities that are designed to further explore quadratic functions.

Pass out to each student, on colored copy paper, the following, in addition to colored pencils, markers, and a sheet of construction paper.

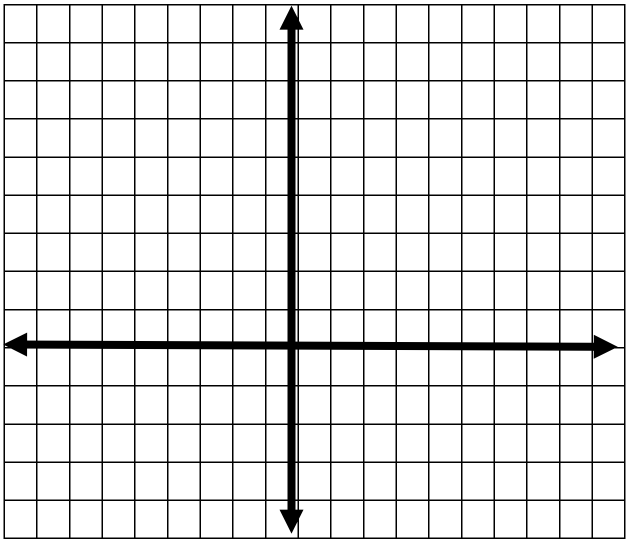
“Quadratic Functions”

I. Complete the chart and graph the following quadratic function.

$y = x^2 - 2x - 8$

x	*y*
-6	
-5	
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	
5	
6	

Graph the data.



1. **Locate points where y = 0 on the parabola. Label these points A. What are the values for "*x*" when:** $x^2 - 2x - 8 = 0$?

2. **Locate points where y = 7. Label these points B. What are the values for '*x*" when:** $x^2 - 2x - 8 - 0$?

3. **Locate points where y = -5. Label these points c. What are the values for "*x*" when:** $x^2 - 2x - 8 = 0$?

II. **Complete the chart.**

x	y
-6	
-5	
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	
5	
6	

$$y = x^2 + 2x - 15$$

Find values for "*x*" for the following:

1) $x^2 + 2x - 15 = 0$

2) $x^2 + 2x - 15 = -12$

3) $x^2 + 2x - 15 = -15$

4) $x^2 + 2x - 15 = 9$

III. **Complete the last chart, below.**

x	y
-6	
-5	
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	
5	

$$y = -x^2 - 2x + 8$$

Find values for "x" for the following:

1) $-x^2 - 2x + 8 = 0$

2) $-x^2 - 2x + 8 = 8$

3) $-x^2 - 2x + 8 = 9$

4) $-x^2 - 2x + 8 = 10$

Collect the activity from each student. Pass out "Solving Quadratic Equations" - <u>Mini-Test.</u> See attached.

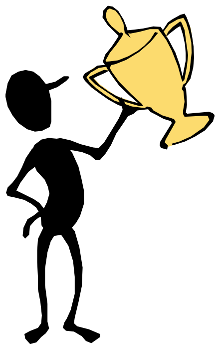
<u>Summarizing Activity:</u> Solving Quadratic Equations – Mini-Test!

<u>Homework:</u> None – Test Day!

Quadratic Criss-Cross

Y3 = Y1 • Y2	**Y1** **(X)**	**Y1** **(X – 3)**	**Y1** **(1 – X)**
Y2 **(3 – 2X)**			
Y2 **(X + 3)**			
Y2 **(2X – 1)**			

Multiply each Y1 by Y2. Sketch the quadratic “graph” result on each grid. What common relationships can you pick out among the graphs?



Solving Quadratic Equations – Mini-Test

Name: ________________________ **Date:** ______________

Solve using *factoring*.

$x^2 + x - 30 = 0$ $x^2 - 7x + 12 = 0$

Graph the related functions: $y = x^2 + x - 30$ **and** $y = x^2 - 7x + 12 = 0$ **with your graphing calculators. What are the "x"-intercepts? Sketch the graphs.**

How can the solutions to a quadratic equation be found by graphing the related function with a graphing calculator? Why? ____________________________

____.

Solve using the quadratic formula and find the solutions to the nearest tenth.

$x^2 - x - 7 = 0$ $-4x^2 = -8x - 7$

Algebra I Lesson Plans for Block Schedule

Day 76 *Warm-Up "EOC Mini-Review" (See attached.)*

Essential Question: **Can I have fun with this Calculator Lab on Graphing Quadratic Functions of the form $y = ax^2 + bx + c$? Will it reinforce what I think I already know?**

Objective(s): 4.02 Graph and evaluate quadratic functions to solve problems.

"SAP": This lab will provide another opportunity to reinforce learned skills and discover/explore further the graphs of quadratic functions.

Lesson Anatomy: Check homework and warm-up.

Arrange the desks to allow students to work in pairs. Pass out the Calculator Lab Worksheets. Throughout the lab, the following questions will facilitate discussion between partners to promote learning through dialogue.

1. **The first sentence reads…why does it say in $y = ax^2 + bx + c$ that $a \geq 0$? Look at the values of a, b, and c in graphs 1-8.**
2. **What were the similarities in the graphs in Part I? Differences?**
3. **How does "a" in $y = ax^2 + bx + c$ affect the graph?**
4. **In Part II, what happens when "a" equals zero?**
5. **How does the value of "c" affect the graph? What is another name we could call the value of "c"? (Hint: what would "c" be called on the graph?)**
6. **In Part III, what were your descriptions of the graphs and what made you decide?**
7. **In Part IV, what did the value of "b" do to the graph?**
8. **What did you predict in Part V? Why?**
9. **What were your solutions to the equation in Part VI? Is there a relationship to Part IV?**
10. **Look at Part VII. What is the "y" intercept and why does it turn down?**
11. **What do you know, without graphing it on the calculator, about the graph of $y = 3x^2 + 4x + 2$?**

***** See attached Lab Worksheets.**

Summarizing Activity: **Complete "graphic organizer" at the end of the lab. (See attached.)**

Homework: **Any EOC Practice Review.**

Not Another One!

Name: ________________ **Date:** ______________

Simplify:

$27 \div 3(5-3)^2$ = ______

$3^2 + 4(8-2) - 6(3) + 4 \div 2 + (8-2)^2$ = ______

Evaluate:

If a = 6 and b = 3; $\frac{2}{3}\left[8(a-b)^2+3b\right]$ **= _______**

If a = 12 and x = 9; $\frac{a^2-22}{2(a+x)}$ **= _______**

Re-write each *absolute value* **equation as 2 equations and then solve.**

$|4x-1|=9$

$|3+2x|-3=15$

Solve each system of equations.

2a + b = 19
3a – 2b = -3

7x + 2y = 3(x + 16)
x + 16 = 5y + 3x

Calculator Lab on Graphing Quadratic Functions
Of the form: $y = ax^2 + bx + c$!

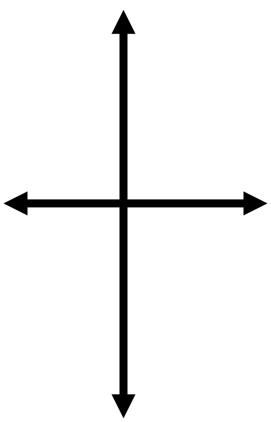
Name: ______________________

Date: ______________________

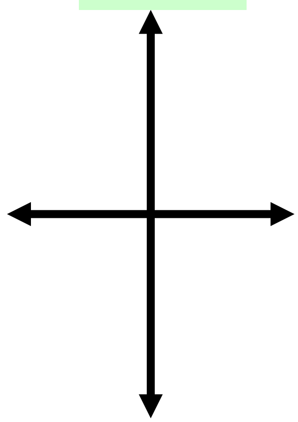
PART I

In this part you will refresh your memory on how the value of "*a*" affects the shape and/or position of the ____________________. Graph the following on your graphing calculator with a "user-friendly" window of X (-5, 4.4) and Y (-10, 10). Adjust as needed to view the graphs clearly. Below, sketch your results.

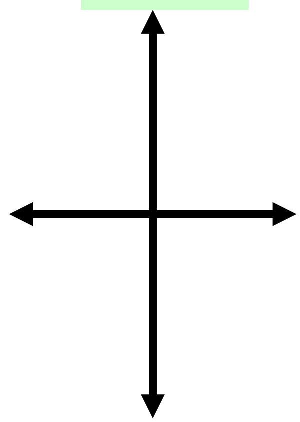
$y = 2x^2$



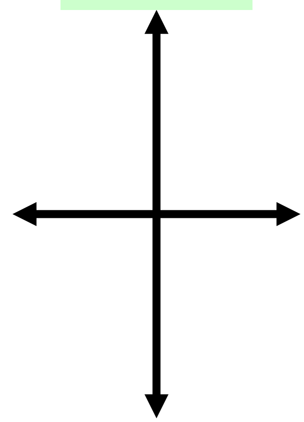
$y = -2x^2$



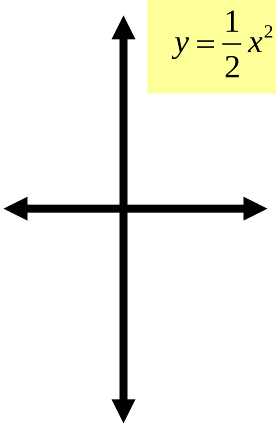
$y = 4x^2$



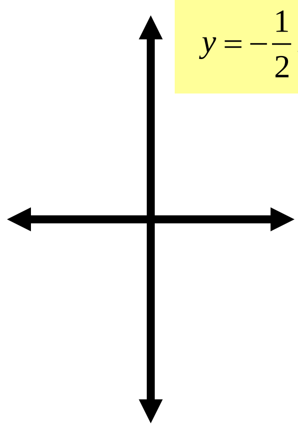
$y = -4x^2$



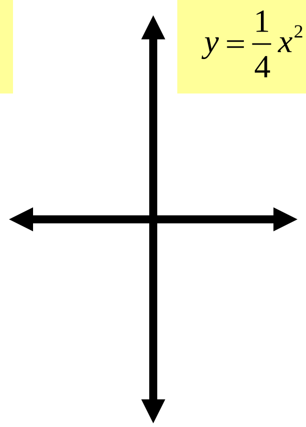
$y = \frac{1}{2}x^2$



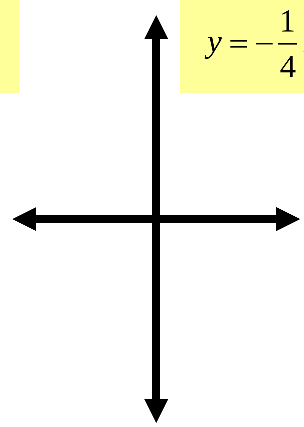
$y = -\frac{1}{2}x^2$



$y = \frac{1}{4}x^2$



$y = -\frac{1}{4}x^2$



What are the similarities in all the graphs?

____

____

____

____ **!!!**

What are the differences in all the graphs?

____

____

____

____ **!!!**

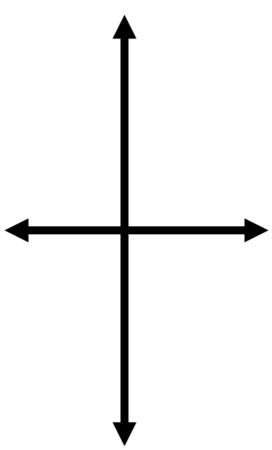
How does "a" seem to affect the graph?

____

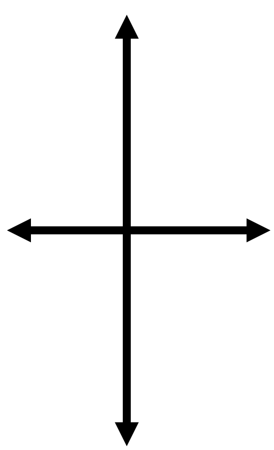
PART II

Now, consider the equation y = ax^2 + bx + c, where b = 0. Graph each of the following on your graphing calculator and sketch what you see, below.

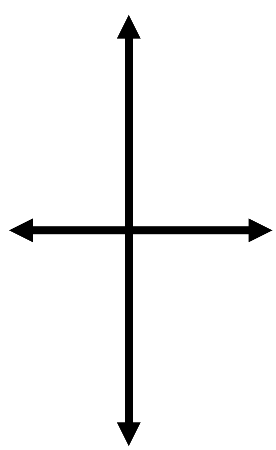
$y = 3x^2 + 2$



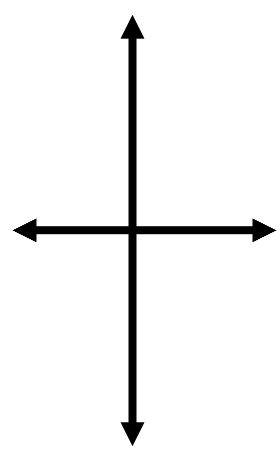
$y = 3x^2 - 2$



$y = 3x^2 - 4$



$y = 3x^2 + 4$



How does the value of "c" seem to affect the graph?

____

____ **!!!**

PART III

Do not use a calculator on this section. Predict how each equation will look from what you learned in Part I and Part II. *Describe* your prediction.

1. $y = x \quad + 4$

   ____

   ____.

2. $y = -x^2 + 4$

   ____

   ____.

3. $y = 5x^2 + 1$

   ____

   ____.

4. $y = \frac{1}{3}x^2 - 5$

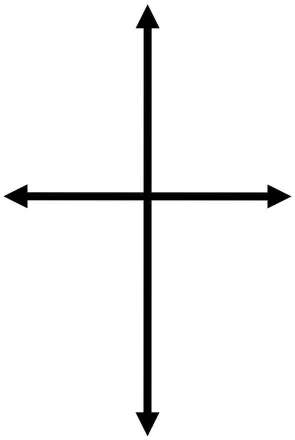
   ____

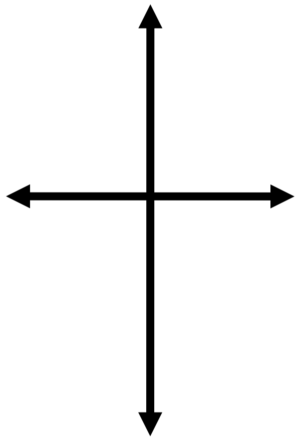
   ____.

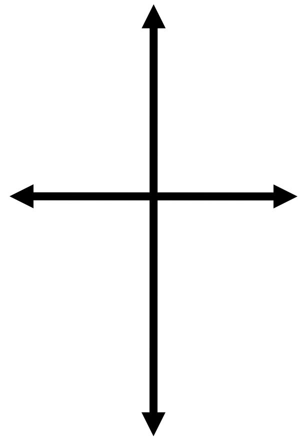
PART IV

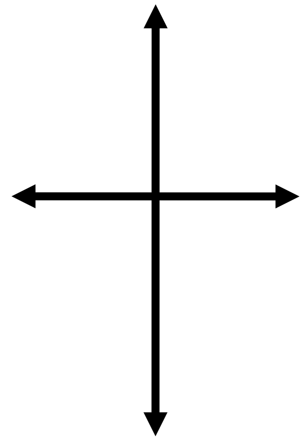
Now, consider the equation $y = ax^2 + bx + c$. Graph each of the following on your calculator and then sketch what you see.

$y = x^2 + 4x + 4$ $y = x^2 - 4x + 4$ $y = x^2 - 3x - 10$ $y = x^2 + 3x - 10$









How does the value of “b” seem to affect the graph?

____
____
____
____ **!!!**

<u>PART V</u>

Do not use your calculator on this section. Use what you have learned from the previous sections to predict the answers to the following questions about:

$y = 4x^2 + 5x + 1$

Which way does it turn? ____

What is the “y-intercept”? ____

Is it average width, narrow, or wide? ________________________________

Is the lowest point on the graph (called the __________) to the left or the right of the y-axis? _______________________ **Graph on the calculator. Were you right?**

PART VI

Solve the following quadratic equations algebraically by factoring. Show your work in the space provided.

$x^2 + 4x + 4 = 0$ $0 = x^2 - 4x + 4$ $0 = x^2 - 3x - 10$ $x^2 + 3x - 10 = 0$

Compare your answers in this part to the functions you graphed in Part IV. What is the relationship?

____
____
____
____ **!!!**

PART VII

A golf ball hit into the air forms a ________________. If $y = 32x - 4x^2$ **models the height of the golf ball in meters for the x seconds it is in the air, graph this on your calculator. What windows did you use?**

x-min _________ x-max ________ y-min ________ y-max ________

Find the maximum height reached by the golf ball. ____________________

How many seconds was it in the air when it reached that maximum (vertex)? ______

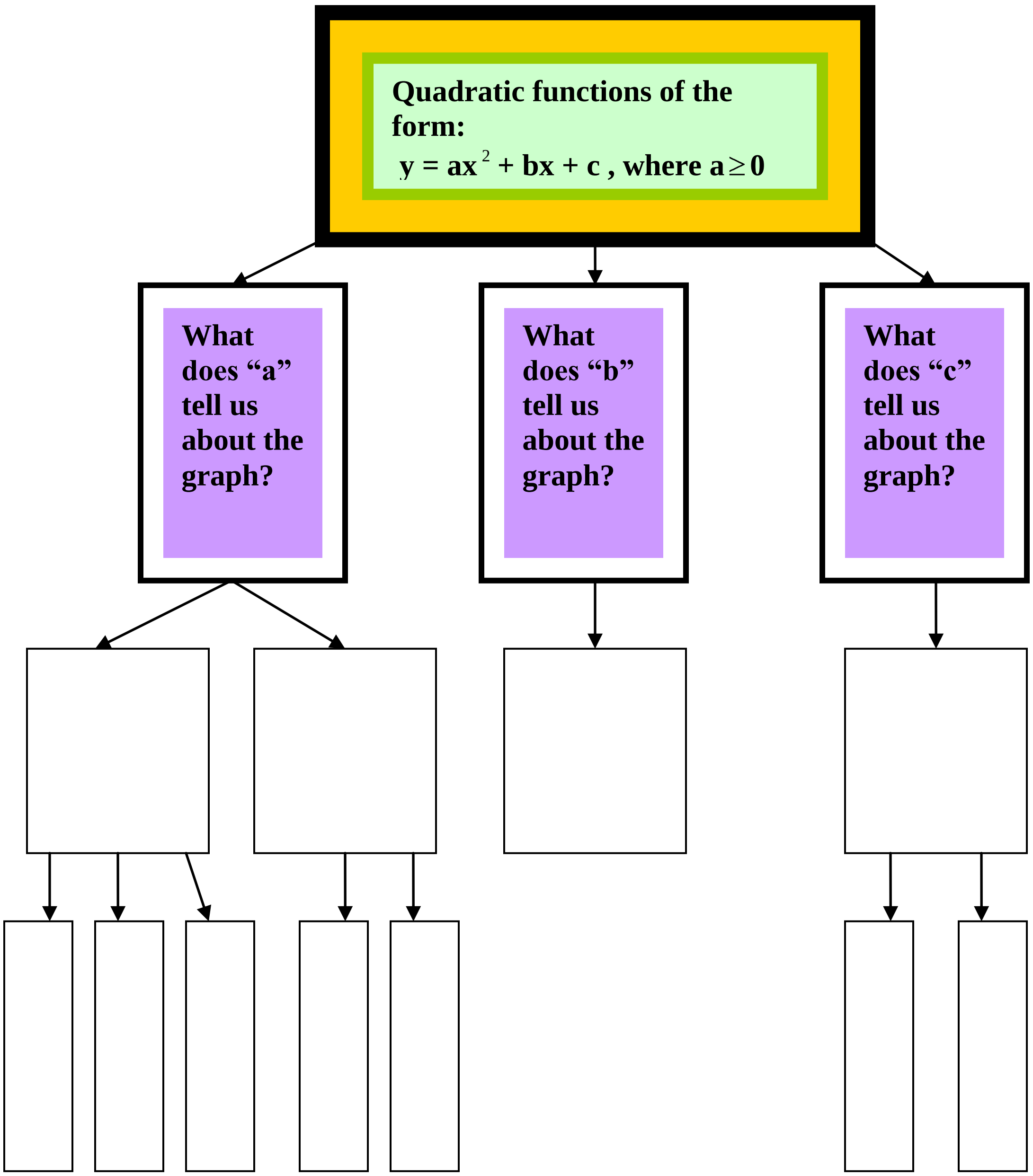
What is the "y-intercept"? _________

What is/are the "x-intercepts"? _________ What do they represent? ____.

What is the solution of $32x - 4x^2 = 0$**?**

____

Partner Groups: Complete the following.



Algebra I Lesson Plans for Block Schedule

Day 77 *Warm-Up "Why are Mr. and Mrs. Number so happy?" (Reviews multiplying monomials.)*

Essential Question: How do I decide by looking at general tables of data, whether the model is linear, quadratic, or exponential? Can I model some changes **in real-world application examples?**

Objective(s): 3.03 Create linear models for sets of data to solve problems.
4.02 Graph and evaluate quadratic functions to solve problems.
4.04 Graph and evaluate exponential functions to solve problems.

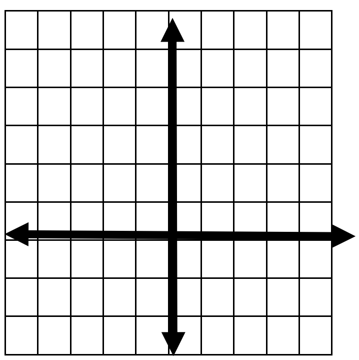
"SAP": Complete Function Model Chart, calculator activity, and mini-quiz.

Lesson Anatomy: Check warm-up and homework.

Pass out to each student a sheet of graph paper that has 6 grids on it. Ask the students to graph the following:

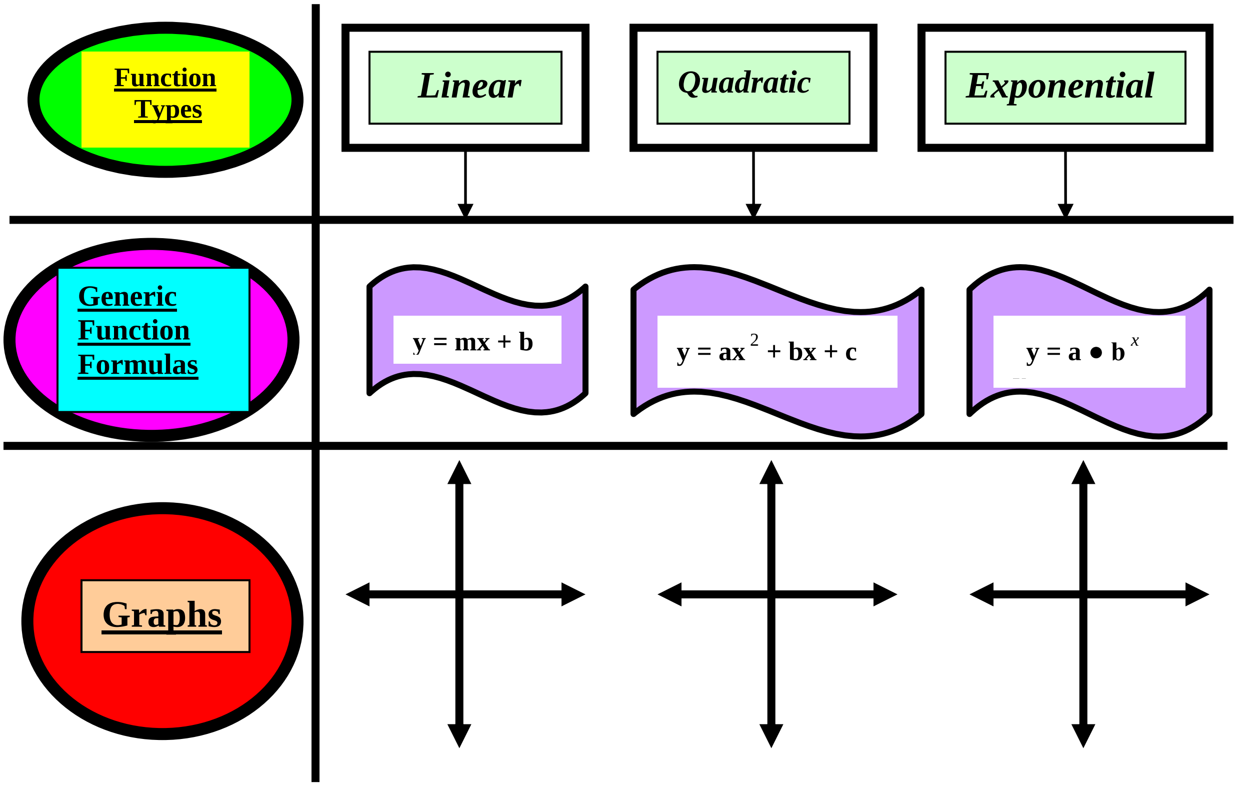
$y = 3x - 1$ $\quad$ $y = \frac{1}{4}x + 2$ $\quad$ $y = 2^x$ $\quad$ $y = \left(\frac{1}{3}\right)^x$ $\quad$ $y = x^2 + 5$

$y = 2x^2 - 1$



Share with students that you can use the linear, exponential, or quadratic functions you have studied, by the above examples, to model some sets of data.

Have the students "generalize" by completing the chart below.



Share with students that the easiest way to determine what model the data will best resemble is by plotting the coordinates if they fit on a basic grid. This provides an immediate "*visual*" clue.

Next, on the overhead, place the data examples from Check Understanding #1 in a table like the following:

x	y

Demonstrate how to arrive at the patterns for "y" to tell which function it models. Also, share visual learner tip from wrap-around (TE pg. 560).

Continue to work through examples 2 and 3, following up with additional examples from wrap-around (TE pg. 562).

Reinforce by using calculators to answer #19 and #24 from pg. 564.

<u>Summarizing Activity:</u> Lesson Quiz 10-9 (TE pg. 565), plus, #20, 22, 23 (pg. 564)

<u>Homework:</u> Mixed Review – pg. 566.

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 78 *Warm-Up "Activity 24: Quadratic Solutions"* Hands-On Activities

Essential Question: What can I "play" to practice for my EOC? Wouldn't you rather play games than listen to the "teacher" talk, AGAIN…?

Objective(s): 4.02 Graph and evaluate quadratic functions to solve problems.
4.04 Graph and evaluate exponential functions to solve problems.

"SAP": The students will play "*Gone Fishing!*" to review an assortment of Algebra I concepts.
This will be followed by "guided**" instruction with the calculator as it applies to 3 real-world examples of quadratic functions.**

Lesson Anatomy: Check homework and warm-up.

Share with students that today's review will involve them in an activity called "Gone Fishing!" Students will be divided into groups of 4. Questions are written on a variety of colored construction-paper fish templates that are numbered, and on the back, a magnet is taped or glued so they will stick to a whiteboard. Place the fish on the whiteboard at random.

Students will be instructed to send one person from each group to the board to select a fish problem and then return to their seats to solve the problem as a group. Once a solution is reached, the recorder will write the fish number and their answer on a tally sheet. A different group member returns to the whiteboard in search of the answer written on a piece of seaweed, crab, or starfish. If they cannot find the answer, they can either decide to return to the group to rework the problem or return the fish to the whiteboard and choose another fish. If they locate the correct answer, they keep the fish (leaving the answer on the board) and another fish is chosen.

After an allotted amount of time, the group with the most fish wins the prize. Verify by having the recorder call out the fish number and answer from the tally sheet.

(See attached for fish problems and solutions.)

Next, pass out the "Real-World" Graphing Calculator Activity. (See attached) Work through the problems together asking probing questions to promote student engagement. Complete activity and turn in.

Summarizing Activity: Ticket-Out-The-Door – Answer: What did you like about the "Gone Fishing" game? What did you learn about the "graphing calculator" while working through the "real-world" problems?

Homework: **North Carolina EOC/Comprehensive Test Preparation – Chapter Practice…***Chapter 10.*

Graphing Calculator Activity

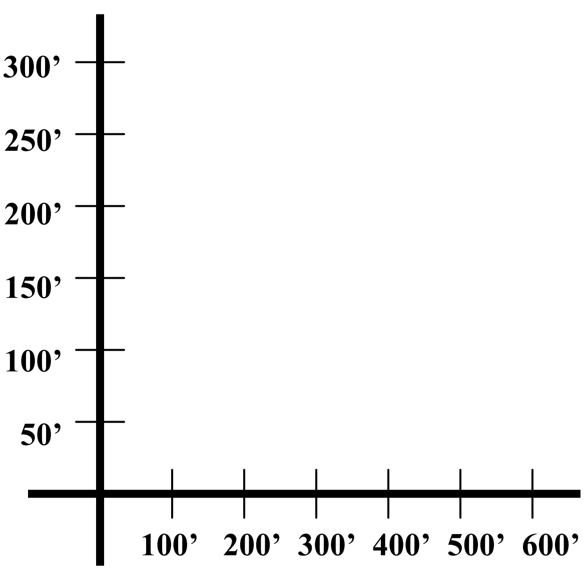
Name: ________________ Date: __________

<u>What Was the Longest Home Run in Major League Baseball</u>?

The longest home run recorded in major league baseball history was hit by Babe Ruth in an exhibition game between the Boston Red Sox and the New York Giants in 1919. The path of the ball is described by the equation $y = x - .0017x^2$.

a) **Draw a chart and calculate the following points. What shape does the graph appear?**

horizontal distance of the ball	height of the ball
50	
100	
200	
300	
400	



b) Graph the equation on your calculator. What range would you use?

x-min = _____ y-min = ______

x-max = _____ y-max = ______

scale = ______ scale = _______

c) What was the greatest height that the ball reached?

d) How far from home plate did the ball land?

From: Kelly, Brendon. Using the TI-81 Graphics Calculator To Explore Functions. Burlington, Ontario: Brendan Kelly Publishing Inc., 1991

Profit or Loss?

The following are equations for the income and expenses for a company where I and E are in thousands of dollars.

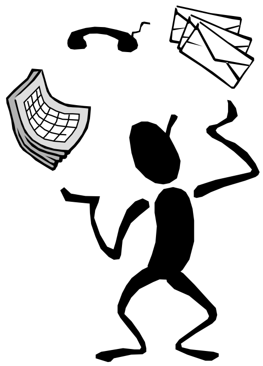
$$I = 2.3x^2 + 4.8x + 1049 \qquad \textbf{(Income)}$$

$$E = 6.5x^2 - 54.4x + 546 \qquad \textbf{(Expenses)}$$

1. **Write a function for the company's profit.**

2. **Graph the profit and describe the company's record over the next 10 years. (Let 0 = this year)**

From: Larson, Kanold, and Stiff. Algebra I. Lexington, Mass: D.C. Heath. 1993.



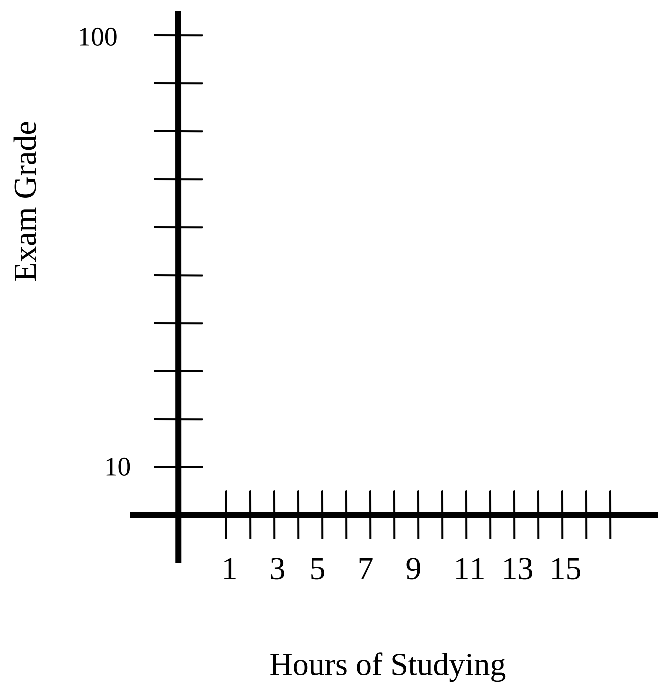
Study Time….

Name: ____________________ Date: ___________________

From past test grades, Jim-Bo know that his exam grade can be estimated by the quadratic equation $y = -2x^2 + 20x + 42$, where x is the number of hours and y is the grade.

Calculate the following and graph the equation.

Hours	Exam Grade
1	
2	
7	
10	
15	



What is the highest grade Jim-Bo can earn? How many hours does he need to study to get this grade?

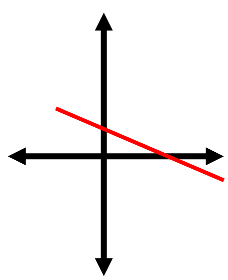
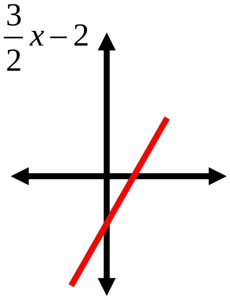
What is the minimum amount of study time needed to obtain a grade of 70?

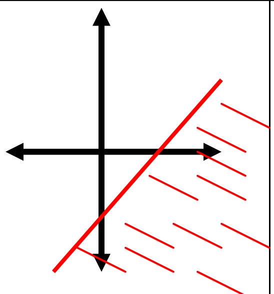
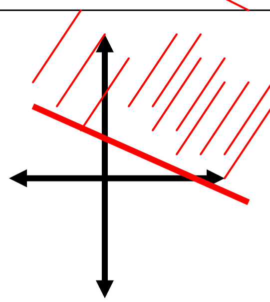
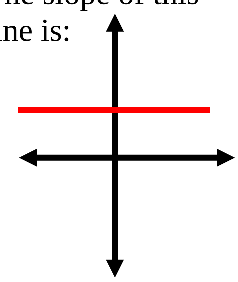
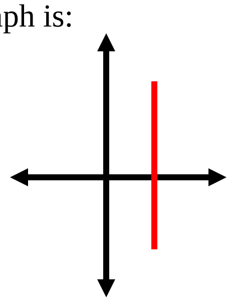
What does the y-intercept tell about studying for the test?

What could be the meaning of the x-intercept?

From: Froelich, Barkowich and Foster. Connecting Mathematics. NCTM

Gone Fishing!

Problems	***Solutions***	**Problems**	***Solutions***
Find the slope of the line(s) that pass through the following pairs of points. (4, 1)(7, -3) (4, -3)(4, 5) (0, 7)(-3, 0)	$-\frac{4}{3}$ undefined $\frac{7}{3}$	Write the standard form of the equation with the following information: (7, -3)(5, 2)	5x + 2y = 29
Graph each equation by using the “x” and “y” intercepts. x + 3y = 3		Write the standard form of the equation with the following information: (-3, 4) m=-3	3x + y =-5
Write each equation in slope-intercept form and then graph. 3x – 2y = 4	y = $\frac{3}{2}x-2$ 	A line containing the point (3, -2) and is parallel to the equation 4x – y = 8. What is the equation in standard form?	4x – y = 14

Problems	***Solutions***	**Problems**	***Solutions***
What is the graph of the inequality: 4x – 3y ≥ 9		Subtract. $x^2 + 2xy + 3y^2$ - $5x^2 - xy - y^2$	$-4x^2 + 3xy + 4y^2$
What is the graph of the inequality: x + 2y ≥ 4		Factor completely. $10k^3 - 15k^2 - 25k$	5k(2k-5)(k+1)
Does this table of data model exponential, linear, or quadratic behavior? x | 0 | 1 | 2 | 3 | 4 y | 3 | 9 | 27 | 81 | 243	Exponential	The slope of this line is: 	O N E
The slope of this graph is: 	**Undefined**	Multiply. (a – 1)(2a ^{2} - 5a- 1)	2a ^{3} - 7a ^{2} + 4a + 1

Problems	***Solutions***	**Problems**	***Solutions***
$(4a – 5b)^2$	$16a^2 - 40ab + 25b^2$	**Add:** $5\sqrt{18}+7\sqrt{25}$	$15\sqrt{2}+35$
Solve the following system of equations. 2a + 3b = 7 3a + 4b = 10	**(2, 1)**	Multiply. **$-3xy(7x^2 - 8xy + 9y^2)$**	**$-21x^3y + 24x^2y^2 - 27xy^3$**
Solve: $\frac{2x+3}{4}-\frac{5x}{2}=\frac{x-8}{3}$	**41/28**	Solve: $\|5x-3\|=18$	**$\frac{21}{5}$; -3**
Add. $2\sqrt{50}+3\sqrt{18}$	**19** $\sqrt{2}$	**Factor:** **$12x^2 - x - 6$**	**$(\frac{3}{4}, \frac{-2}{3})$**

<u>Algebra I Lesson Plans for Block Schedule</u>

Day 79 *Warm-Up "Inverse Variation – Grafun" (Reviews graphing equations expressing inverse variation)* <u>*Algebra With Pizzaz.*</u>

<u>Essential Question:</u> How can I improve my understanding of graphing equations and inequalities?

<u>Objective(s):</u> 4.01 Use linear functions or inequalities to model and solve problems; justify results. a) Solve using tables, graphs, and algebraic properties.
4.02 Graph, factor, and evaluate quadratic functions to solve problems.
4.03 Use systems of linear functions or inequalities in two variables to model and solve problems. Solve using tables, graphs, and algebraic properties; justify results.

<u>"SAP":</u> Graphing Calculator Activity – Using the TI-83 to Solve Equations, Inequalities, and systems of both!

<u>Lesson Anatomy</u>: Check homework and warm-up.

Pass out "calculator activity". Partner students to complete the attached.

<u>Summarizing Activity:</u> Ticket-On-The-Train – What 3 things did you learn from the calculator activity?

<u>Homework:</u> EOC Practice Review

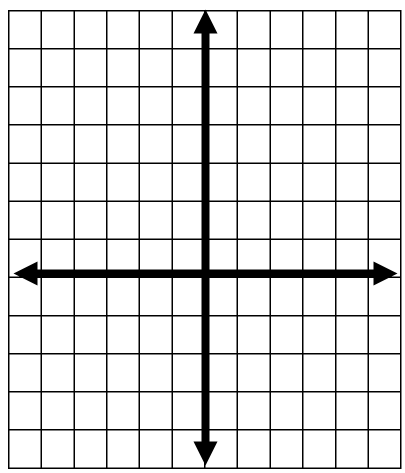
Using the TI-83 to Solve Equations and Inequalities…and "Systems"of Both.

Name: ________________________
Date: ________________________

Solve with pencil and paper.

$-2x + 15 = 0$

Sketch the graph:



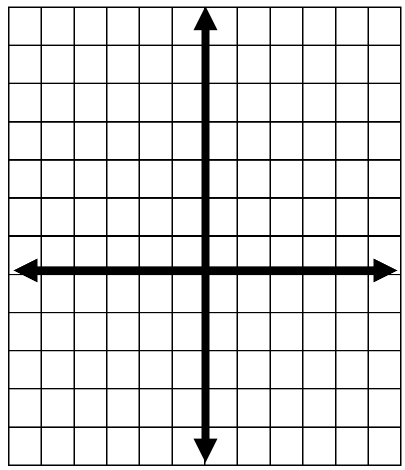
What is the relationship you see between the algebraic solution and the graph?

Solve: $-2x + 15 < 0$ algebraically. How does its solution relate to the graph?

Solve: $-2x + 15 \geq 0$ algebraically. How does its solution relate to the graph?

Solve: $3x + 2y = 4$
$-x + 3y = -5$ algebraically.

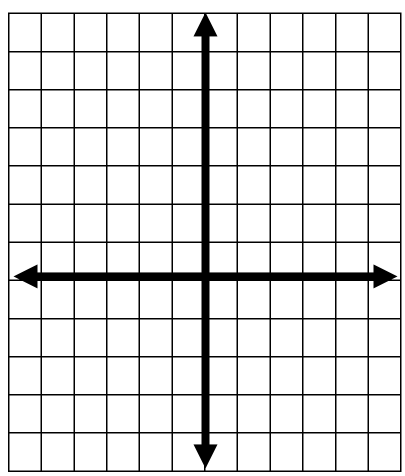
Sketch the graph.



What is the relationship you see between the algebraic solution and the graph?

Solve: $x + y > -2$
$2x - 3y > -9$ algebraically.

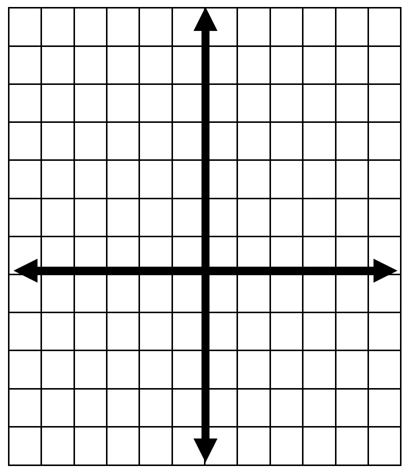
Sketch the graph.



What is the relationship you see between the algebraic solution and the graph?

Solve: $x^2 - 12x + 35 = 0$

Solve algebraically. **Sketch the graph.**



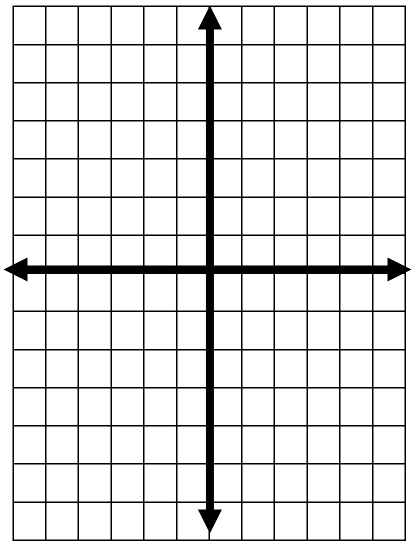
What is the relationship you see between the algebraic solution and the graph?

Solve $x^2 - 12x + 35 < 0$ algebraically. How does its solution relate to the graph?

Solve $x^2 - 12x + 35 \geq 0$ algebraically. How does its solution relate to the graph?

Do you know how to solve $x^3 - 2x^2 - 5x + 6 = 0$ algebraically? If not, could you solve it graphically now?

Sketch the graph.



Name the solution(s) by interpreting the graph. ________________________.

Solve: $x^3 - 2x^2 - 5x + 6 < 0$

________________________.

Solve: $x^3 - 2x^2 - 5x + 6 > 0$

________________________.

Solve: $x^3 - 2x^2 - 5x + 6 \leq 0$

________________________.

Solve: $x^3 - 2x^2 - 5x + 6 \geq 0$

________________________.

Solve the following on your calculators.

$-x^2 + 4 = 0$ ________________________	$2x^2 - 3x - 7 = 0$ ____________________
$-x^2 + 4 < 0$ ________________________	$2x^2 - 3x - 7 < 0$ ____________________
$-x^2 + 4 > 0$ ________________________	$2x^2 - 3x - 7 > 0$ ____________________
$-x^2 + 4 \leq 0$ ________________________	$2x^2 - 3x - 7 \leq 0$ ____________________
$-x^2 + 4 \geq 0$ ________________________	$2x^2 - 3x - 7 \geq 0$ ____________________

$2x - \frac{7}{3} = 0$ ____________________

$2x - \frac{7}{3} < 0$ ____________________

$2x - \frac{7}{3} > 0$ ____________________

$2x - \frac{7}{3} \leq 0$ ____________________

$2x - \frac{7}{3} \geq 0$ ____________________

$-2x^2 + 13x - 20 = 0$ _________________________

$-2x^2 + 13x - 20 < 0$ _________________________

$-2x^2 + 13x - 20 > 0$ _________________________

$-2x^2 + 13x - 20 \leq 0$ _________________________

$-2x^2 + 13x - 20 \geq 0$ _________________________

$x^3 - 3x^2 - x + 3 = 0$ ___________________________

$x^3 - 3x^2 - x + 3 < 0$ ___________________________

$x^3 - 3x^2 - x + 3 > 0$ ___________________________

$x^3 - 3x^2 - x + 3 \leq 0$ ___________________________

$x^3 - 3x^2 - x + 3 \geq 0$ ___________________________

Day 80 *Warm-Up "More Gosh, Darn, EOC Review Stuff!" (See attached)*

Essential Question: How am I going to remember all this "algebra I" material? There is so much to know…can you help me *recap* and *organize* it all?

Objective(s): All of them!

"SAP": The students will create a mini "Booklet Recap" where they will solve problems, fill in the blanks, graph, cut, and paste. They will truly be publishers!

Lesson Anatomy: Check homework and warm-up.

The students will complete a concept organizer. Create it in booklet form with each student as individual authors. Use a variety of colored paper and decorate the cover with colored pencils and markers.

See attached to create the book.

Summarizing Activity: Inside-Outside Circle – students will form an inner and outer circle. To the person they are in front of, they will share 2 of the most fun concepts they like to work with. Take turns. Lastly, rotate 3 to the left and share their most favorite concept to graph and the 1 concept they have the most difficulty doing/understanding.

Homework: Quadratic Factoring Practice.

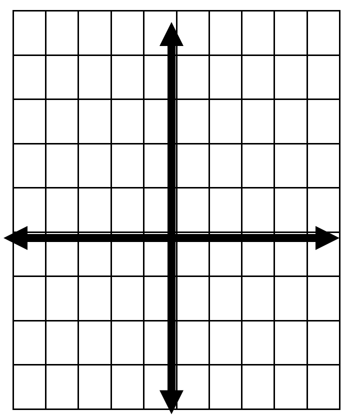
The End! Good Luck!

No More Gosh, Darn, EOC Review Stuff!

Name: ______________________________
Date: ______________________________

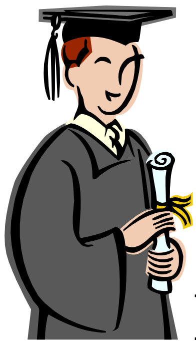
Solve: $7x - 6 = -2(x + 3) =$

Graph: $y = -\left|2x\right| + 2$ when the domain = $-3 \le x \le 3$



A 2-year old child spends an average of one hour each day awake and alone, a 3-year old spends four hours, and a 5-year old spends ten hours. Write the slope-intercept form of the equation for this problem. (Hint: make a table first.)

If the price of a movie ticket is $3, than all 40 students are going. For every $2 increase in the price, 5 students decided not to go. What is the slope of this linear relationship?



<u>Booklet Recap</u>

Below, identify the "order of operation" rules!

<u>P</u>: ______________________

<u>E</u>: _____________________

<u>M/D</u>: ____

<u>A/S</u>: ____

Solve the following to build your confidence!

$5 + (3 + 2)^2 \div 5 + 6 \cdot 2 =$ ________________

Properties

$3 + x = x + 3$ ________________ $(4 \times 6) \times 9 = 4 \times (6 \times 9)$_______________

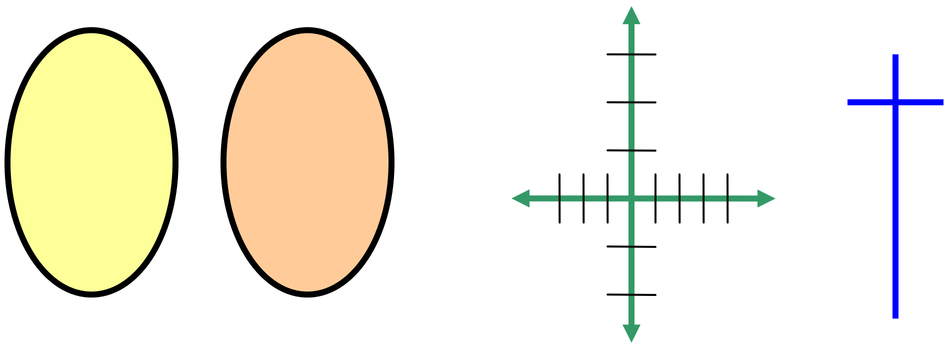
$3(c + 4) = 3c + 12$ _______________________

What is a "<u>relation</u>" ? _______________________________________

$(-2,1),(0,-1),(1,1),(2,-2),(1,2)$ **Is this a relation? ___________**

What is the domain? ________________ Range? ______________

Map it, graph it, and put it in a table below.



Is the relation a *function*? Why? __________________________

What is the "*multiplicative inverse*" of $-\frac{1}{3}$ **? _____**

What is the "additive inverse" of 3? _____

Slope

"__________" over the "______". Formula = _________ !

Writing & Graphing Equations

Writing & Graphing Equations

***Standard Form*: __________________ What does the "A" represent? ______**

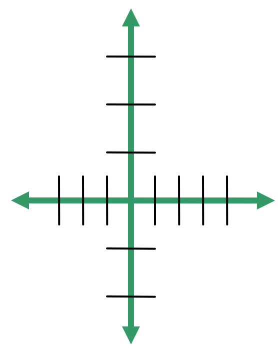
***Point-Slope Form*: ___________________ This works great when you know the __________ and an _____________ _______.**

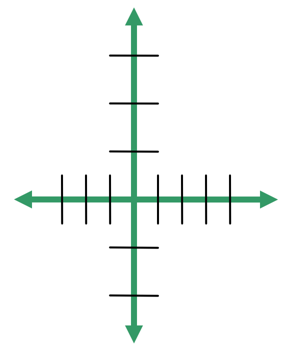
Our favorite…______________________

The letter "m" represents the __________ and "b" is the ___ intercept, which has an ordered pair of (0, __).

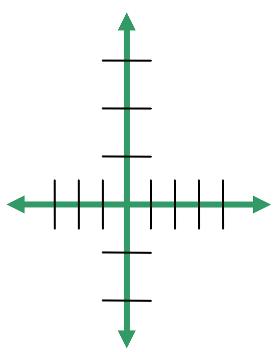
Graph an "undefined" slope.

Graph a slope of 0.





Draw a "positive and negative" slope of a line, in orange and red.



How do you find the "x" and "y" intercepts?

____

What are the "x" and "y" intercepts for the equation 3x + 4y = 12? ____________

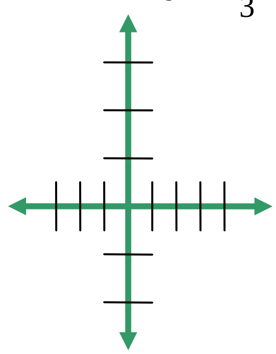
Inequalities... **Solve each inequality and graph the solutions.**

$6 < y < 10$

$-13 < 3c + 2 \leq 17$

Systems of Equations and Inequalities

Solve by graphing: $y = -x - 2$ & $y = \frac{2}{3}x + 3$

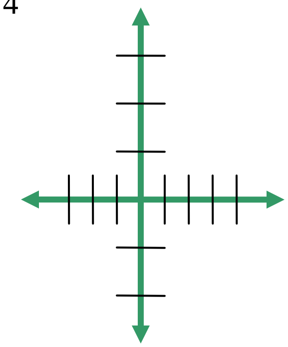


Solve: $y = 3x + 2$ & $6x - 2y = -4$ **Answer: ______________**

Solve by "substitution": $3y + 2x = 4$
$-6x + y = -7$ **Answer: ______________**

Solve by "*elimination*": $3x + 6y = -6$
$-5x - 2y = -14$ **Answer: ______________**

Graph the following system of *inequalities*: $2x - \frac{1}{4}y < 1$ **&** $4x + 8y > 4$



Can you simplify this? $\sqrt{60} =$

$$\frac{\sqrt{80}}{\sqrt{5}} =$$

Quadratic Functions

Solve the following by factoring and then check your answer by using the *quadratic formula*.

$2x^2 - 5x - 12 = 0$

Simplify

$(a^2 + a + 1) + (5a^2 - 8a + 20) =$

$(7h^2 + 4h - 8) - (3h^2 - 2h + 10) =$

$-5c^3(9c^2 - 8c - 5) =$

The End!